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Modern conservation systems

Tile outlet terraces; Minimum tillage

Also:

Economic growth in Cherokee Hills

Mountain recreation enterprise

Soil Conservation Service

U.S. Department of Agriculture

Soil **Conservation**

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Modernizing . . .

Public concern about conservation naturally centers on problem land areas and emerging environmental topics. This month, we turn our attention instead to the agricultural heartland of America, so easily taken for granted.

We invited our field people to report on how conservation farmers there are protecting their soils from the impact of modern technology.

Make way for machines

Conservation Engineer Peter Forsythe describes (p. 4) the modern terrace systems evolved by farmer experience and engineering know-how to make way for large equipment.

Two reports, one by Conservation Agronomists Walter Guernsey and Dentis Colson of Kentucky (p. 6) and the other by John Maddy of Iowa (p. 7), give a sampling of minimum tillage methods used by many farmers to keep the soil covered even while growing continuous row crops.

Economic growth

We continue to get reports of the economic gains that flow from concerted planning for development and use of an area's natural resources.

The pride of local RC&D Committee Chairman Harvey Chase shows through his account, coauthored with SCS Conservationist Allen Moss (p. 11), of the new jobs and income that mark the first 3 years of the Cherokee Hills project.

Volume 35

Soil Conservation begins its 35th year with this number.

COVER: Soybean planter follows immediately after wheat combine in minimum tillage farming in the St. Charles Soil and Water Conservation District, Mo.



August 1969

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SOIL CONSERVATION

Conservation systems for modern farmers

By **R. C. Barnes** and **B. D. Blakely**

Agricultural engineer and agronomist, SCS, Washington, D.C.

Modern conservation measures for farmland not only must reduce soil and water losses but they must make it possible to produce crops with the minimum of labor and the maximum efficiency of machines.

Over half the Nation's cropland is used for row crops and fallow. In several states, these uses make up 70 percent or more of the crop acreage; in many counties they exceed 80 percent. The trend toward larger farms and more tilled crops requires conservation practices that are compatible with modern farming methods and equipment.

Planning a modern conservation system calls for careful attention to the fields within the farm boundary. Field boundaries are usually manmade and consist of a fence or hedgerow which requires turning of farm equipment. Most of them were established long ago when farming was done with horses and mules and plenty of labor. In those days time lost on the turnrow was not so important. It often is necessary to remove such manmade barriers and relocate fences to provide larger fields for efficient farming.

Farmers no longer can tolerate sharp curves in their terraces and contour rows. Multiple hitches, wider equipment, and newer methods of growing crops make it imperative to consider the ease with which conservation measures needed on cropland can be established and maintained.

Landforming or smoothing either before or during terrace construction can aid in installing a more efficient terrace system. In the smoothing operation, low areas are filled and high areas that block row drainage are cut, providing a smooth field throughout the terrace length. This eliminates wet and dry areas and provides for more efficient planting, cultivating, and harvesting.

On steeper slopes, construction of terraces from the downhill side can reduce the land slope between terraces. On deep soils that will permit heavier cuts, some benching

of land with construction equipment between terraces may be done.

Whenever possible, terraces should be parallel. This provides an even number of rows throughout the terrace length and eliminates the point rows and odd areas which require turning of equipment.

Terrace shapes are also changing. On moderate slopes terraces are wider with the side slopes designed to fit the width of cultivation and planting equipment. The channels are broad "V's" with sides also of widths to fit equipment.

On steeper slopes terraces with grassed backslopes are becoming popular. The uphill slope is constructed in the usual manner; the downhill one is made steep and planted to grass or hay crops. With modern herbicides, weeds on the grassed backslope can be controlled.

In some areas grassed waterways for terrace outlets are being replaced by buried tile lines running downslope with vertical perforated risers in low spots in the terrace channels. Terrace runoff water enters the risers and moves through the pipe to a safe outlet. The risers are placed in the terrace channel so they can be easily passed by large farming equipment.

Various kinds of minimum tillage may change the need for some of the practices that have long been used. There is plenty of evidence from research studies and farmer experience that minimum tillage reduces soil losses, especially when previous crop residues are left on the surface. Plant growth regulators that suppress cover crops and new equipment that will plant through residues are now available, and better ones will be developed.

In response to new research, new machinery, and new materials, design of conservation farming systems is changing at a rapid rate. ♦

X *Farmers like their farmability.*

Tile-outlet terraces

By Peter Forsythe

Assistant state conservation engineer, SCS, Indianapolis, Ind.

The combination of underground tile outlets with parallel terraces has given farmers an answer to one of the troublesome obstacles to conservation farming with modern machinery—the sharp curves and uneven interval widths commonly associated with conventional terrace systems.

So pleased are farmers with the new mode of terracing that in Indiana alone the amount of parallel terraces installed in 1968 was 45 times that of 1965.

Not a new idea

Tile outlets really are not a new idea. They were described and recommended in U.S. Department of Agriculture Bulletin 512, *Prevention of Erosion of Farm Lands by Terracing*, in 1917. Some were installed by CCC conservation camps in 1935, but no real acceptance was gained until the idea was revived in Iowa in the early 1960's.

Farmers like parallel tile outlet terraces for their "farmability." With them, the farmer can have long even rows and flat ridge slopes, so he can crop all of his field with the widest equipment. He no longer has to farm around waterways or raise equipment when crossing them.

When these terraces cross ridges or are built on steep slopes, material to construct them is excavated from the lower side. This reduces the field slope between terraces by a fifth or more. As the terraces are farmed, soil tends to move into the channel area of each terrace, increasing the benching effect.

On slopes of 8 percent or more, the backslope is made narrow and steep and is planted to grass.

Erosion control is the principal reason for building terraces. Any terrace system must be designed to break up field slopes so that soil loss is held within tolerable limits.

On many soils that need terracing, considerable erosion is likely to occur before grassed waterways can be well established. Tile outlets, in contrast, carry water underground to exit channels with no possibility of waterway scour.

A sediment trap

Because of the pooling effect in tile outlet terraces, very little sediment leaves the field. Only the very

fine silts and clays, which remain in suspension for hours, are carried to outlets. The offsite sediment reduction benefits, alone, can pay for a terrace system in a few years. Because of this, there is good reason for the Government to share in part of this conservation investment.

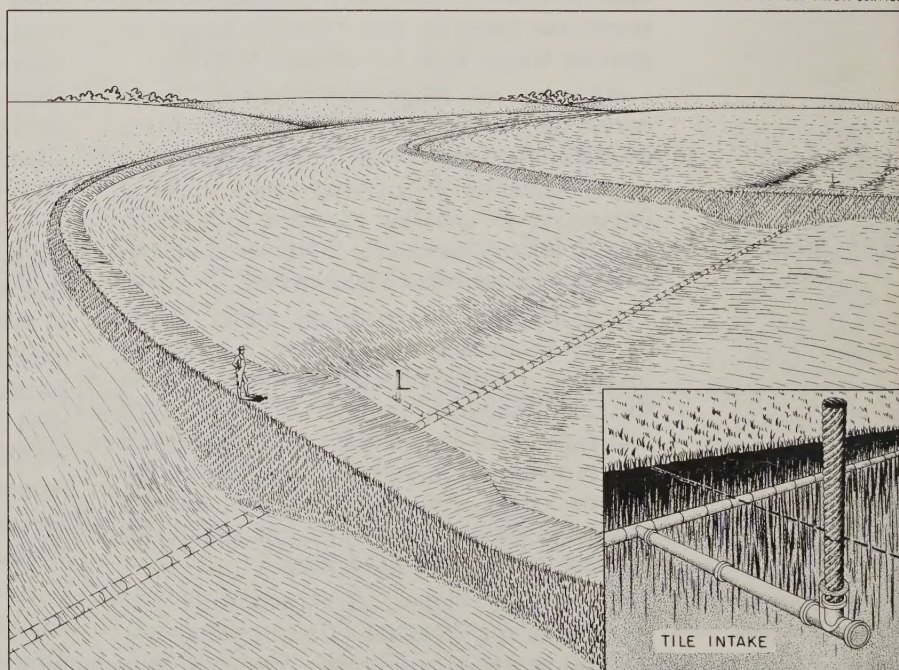
Each parallel tile outlet terrace is a small floodwater-retarding structure and must be designed individually as such. A section of the terrace near the outlet is built with a level ridge high enough to provide the required storage, depending on the watershed area above the terrace and the design storm used. The recommended design is to store runoff from a 10-year-frequency 24-hour rainfall plus 25 percent additional volume for sediment.

Designed individually

Because each terrace must be designed individually, a considerable amount of time is spent in the trial-and-error method of computing total storage for various assumed terrace ridge heights until a satisfactory design is achieved. Several labor saving procedures have been considered to extend available SCS manpower for technical assistance.

U. S. DEPARTMENT OF AGRICULTURE

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TILE OUTLET TERRACES



The pipe intake to the underground tile outlet (above) is installed in the terrace channel where it will interfere least with rowcrop equipment. An aerial view of the system (right) shows parallel spacing of terraces and traces of tile outlets.



One of the more promising appears to be the use of computers to determine storage and earthwork quantities in design.

In 25 seconds, a computer can provide more information on a terrace system than a skilled technician can calculate in 12 hours. In addition to determining the terrace ridge height, as is done by manual computation, the computer program determines quantities of earth to be moved and adjusts the design to bring earthwork within a desirable balance for good construction.

A valuable bonus of earthwork balancing is that the resulting design provides a minimum volume of fill. For example, the original design for one system of eight terraces had a cut volume of 2,773 cubic yards and fill volume of 7,135 cubic yards. The computer-balanced design called for 6,121 cubic yards of cut and 4,694 cubic yards of fill. Although balanced design cannot be used on every terrace because of soil and site conditions sometimes present, such designs, where applicable,

make possible considerable savings in construction costs.

For maximum benefits

The farmer's work is not over when a terrace system is completed. Actually, it has just begun, if he wants to reap maximum benefits from his investment. Small areas where fill material was borrowed and the deeper channel cuts need extra fertilizing and application of organic matter. These areas can be brought back into full production within a few years.

Slopes and layout are such that a farmer can plant and till the terraces and all the area between them. It is important to plan tillage operations to maintain the terrace cross section and avoid dead furrows at the same location every year.

With a well planned and maintained parallel terrace system, a farmer saves fuel and time in farming at the same time he is saving topsoil and fertility on the field and reducing the plague of America's No. 1 water pollutant—sediment. ♦

Blue lupine variety for Southeastern U.S.

A new variety of blue lupine, the first especially bred for winter hardiness, has been released to breeders. Cooperatively developed by USDA's Agricultural Research Service and the Georgia and Florida agricultural experiment stations, the new variety, "Frost," is intended for production in the lower Coastal Plains of the southeastern states.

Many of the hazards to growing lupine in this area should be eliminated by the new variety. It can withstand temperatures almost 10° F. colder than other varieties tolerate. Moreover, its resistance to anthracnose and grey leafspot—the crop's major diseases—promises Frost an important role in the future improvement of livestock and soil programs.

The new variety may be used for late winter and early spring grazing, for hay or silage, or turned under for soil improvement. Also, it can be grown in association with rye and oats. ♦

Minimum tillage for row crops

No-till no-plow, wheel track or slot planting—by whatever name, the many variants of the new way of farming give good yields with maximum soil protection



System gains with corn, soybeans

By **Walter J. Guernsey** and
Dentis A. Colson

Conservation agronomists, SCS, Lexington and
Bowling Green, Ky.

Minimum tillage as a way of growing corn and soybeans has overcome the initial skepticism of farmers. Kentucky saw about a half million acres of row crops planted this modern way in 1968.

Minimum tillage can be adapted to many situations and conditions. It can be used equally well by a farmer with a few acres of row crops or by one with several hundred acres.

Many names have been coined

to describe local variations of minimum tillage, such as wheel-track planting, mulch planting, crop residue planting, plow-planting, zero tillage, sod planting, slot planting, and others.

Minimum tillage methods for corn and soybeans have been used in Kentucky for some 12 to 13 years. The beginning was slow, but there are always a few farmers anxious to try something new. Of the half million acres last year, some 100,000 acres was planted in established sod, crop residue, and in winter cover crops without prior seed-bed preparation.

"No-till" or "no plow" planting is the latest kind of minimum tillage, and it is receiving an enthusiastic reception. It reduces the labor cost, cuts soil losses sometimes as much as 90 percent, and makes it easy to maintain soil tilth.

This kind of minimum tillage is achieved with planters that disturb only a narrow strip of soil over the crop row. Several types of no-tillage planters are available. The width of disturbed soil varies from 2½ to 12 inches.

No-till planting has been successful in sods of Kentucky-31 tall fescue, orchardgrass, timothy, red clover, alfalfa, Korean lespedeza, and various mixtures of these grasses and legumes. Weed control in corn is easiest when the crop is planted in a heavy fescue sod.

Likewise, planting of corn or soybeans in residues of corn, soybeans, small grain, and grain sorghum has been very satisfactory. So also has double cropping of corn, soybeans, or grain sorghum with small grain.

Regardless of the kind of row crop and when it is planted, the use
(Continued top of p. 7)

of herbicides is an essential of successful minimum tillage, especially with the no-till methods. The herbicides take the place of cultivation for controlling weeds.

In Hardin County minimum tillage was started in 1962 by a half dozen farmers. These farmers became leaders in the development of new kinds of equipment and in adapting old equipment for minimum tillage use by small farmers.

Robert C. "Bob" Wade, associate

supervisor of the Hardin County Soil and Water Conservation District, president of the Hardin County Farm Bureau, and Kentucky's Outstanding Young Farmer for 1968, was one of these leaders. In 1962 Wade planted 15 acres of corn by wheel-track planting in old Kentucky-31 fescue sod.

In 1968 he planted 100 acres by the no-till method and 220 acres by wheel-track. He used herbicides on the no-till fields.

"My no-till corn was the best corn I had, but all minimum tillage yields were close behind, and all were better than those from conventionally planted corn," Wade said.

In 1969 he plans to have 200 acres of no-till corn and 225 acres of wheel-track planted corn, with none planted by the old methods.

James Robert "Bob" Wade (not related to the Hardin County Bob Wade) of Simpson County plants

(Continued to p. 10)

The airplane is an important minimum tillage tool. On opposite page, a plane seeds wheat in a field of standing corn a month before harvest. Below, the resulting crop in February gives complete soil cover among the cornstalks.



Crop residues substitute for grass in rotation

By John K. Maddy

Conservation agronomist, SCS, Des Moines, Iowa

The trend away from grass in rotation with corn is being offset by increased use of mulch tillage for soil protection in the Corn Belt.

A survey in Iowa last summer showed that 1,400 farmers were using some type of mulch tillage and another 3,000 were planting corn in unplowed seedbeds. Farmers using various mulch tillage systems planted nearly a half million acres of corn and soybeans in Iowa in 1968.

Before the present revolution in agricultural technology, Iowa farmers depended strongly on grass and

legume meadows to help control soil erosion. Such cropping systems kept weeds, insects, and plant diseases in check and supplied nitrogen to the soil.

Today, nitrogen is cheaper to buy than to obtain by growing legumes. Weeds and insects are usually controlled with chemicals and diseases by planting resistant varieties of crops. Corn and soybeans bring better return in the market than hay and pasture. A farmer without roughage consuming livestock has little reason, except for erosion con-

trol, to grow grass in rotation with row crops.

Although the corn acreage has remained fairly stable in Iowa for the past decade, soybean acreage has more than doubled, almost all at the expense of hay and pasture land. The result is to expose more land to erosion by water and wind and allow more rapid deterioration of soil structure.

Experience of many conservation farmers, however, indicates that the large volume of residue left in a high-yielding cornfield after harvest can be used as a mulch to protect the soil.

William G. Harvey, a cooperator with the Emmet County Soil Conservation District, plants between 600 and 700 acres of corn each year. Harvey uses a till-planter which prepares a seedbed in the row as it plants, leaving the residue of last



A chisel planter puts seed, fertilizer, and herbicide in the soil at one operation with minimum disturbance of the residues.

year's crop undisturbed between the rows. This system provides good soil protection for approximately two-thirds of the land during the early growing period when erosion hazard is greatest. The elimination of plowing, disking, and harrowing operations reduces tillage costs by one-half. Yields are as good or better than those obtained by conventional methods.

James Van Gelder near Orange City in northwest Iowa uses a chisel planter that tills the soil without turning it. It leaves residues spread more completely on the surface than most other equipment. A rain in early June last year caused no runoff between his terraces; in the same storm some of his neighbors' terraces overtopped. He planted 300 acres of corn with only 125 hours tractor time, including chopping and disking stalks, application of fertilizer, and planting.

Wes Roeschke near Merville in the Woodbury County Soil Conservation District uses a planter adapted to follow fluted rolling coulters that prepare a very narrow seedbed for each row. This method offers maxi-

mum erosion protection by disturbing a minimum area of soil.

Roeschke also used this no-tillage tool to plant in the previous year's residues on terraced land. In 1968, he had no runoff between terraces, and yields were uniform over the entire field. He estimates that he cut his tractor fuel bill in half on 200 acres planted without plowing.

The amount of residues left on the surface and the percentage of a field covered determine the degree of soil protection. Germination may be delayed and early growth retarded, however, during cool, damp seasons on soils slow to drain and warm up. This is often reflected in reduced yields. In contrast, during

Effect of residues on soil loss with continuous corn

Distribution of residue	Amount of residue lb./ac.	Soil loss ton/acre	Rotation equivalent* continuous corn
No mulch (conventional planting)		10.0	
2/3 cover	3,500	5.0	CCCOM
2/3 cover	5,000	3.3	CCOM
2/3 cover	6,500	2.5	CCOMM
90% cover	3,500	3.3	CCOM
90% cover	5,000	2.0	COM
90% cover	6,500	1.0	COMMM

* C = corn, O = oats, M = meadow.

periods of drought or high temperatures, additional residues conserve soil moisture and improve yields.

Information compiled by SCS agronomists in the Corn Belt from federal and state research on soil and water losses under different cropping systems indicates that crop residues on the surface after planting can reduce erosion on continuous cornfields as effectively as grass in the rotation.

Wind erosion has been increasing in Iowa in recent years. The increase appears to parallel the increase in acreage devoted to row crops and to be associated with increased soybean acreages in northwest and north central Iowa. Fall-plowed soybean fields suffer more wind erosion than fall-plowed cornfields.

Some farmers are combating wind erosion on soybean fields by delaying plowing until spring. Farmers are encouraged to use a disk, field cultivator, or chisel plow rather than a moldboard plow to prepare seedbed for soybeans.

Cy Houser, a district cooperater near Woolstock, says his soybean land does not seal and form a crust when disked as it does when plowed. In 20 years of using a disk, he has had practically no soil loss by both wind and water because of mulch tillage on his nearly level farm.

New tillage systems present new problems which must be met by new technological solutions. Most Iowa farmers using mulch tillage broadcast phosphorus and potash fertilizer before planting. Most use dry or liquid fertilizer at planting time in addition to other applications.

Application of a herbicide in the row is important with mulch tillage methods. Those who cultivate find the use of rolling disk hillers instead of shovels or sweeps helps prevent trash from collecting around cultivator shanks.

Another advantage of mulch tillage and no-till planting is that unplowed cornfields provide grain during the winter months for many forms of wildlife. ♦

In southern Idaho where most farms are irrigated and most conservation effort has been spent on husbanding the short water supply and protecting irrigable soils, landowners are now tackling the critical problem of erosion on "dryland" cropland.

Unusually severe rainstorms in 1965 raked the dryland fields, caused unprecedented erosion, and spurred a coordinated effort by local soil conservation districts, Soil Conservation Service, and the Agricultural Stabilization and Conservation Service.

To help get work underway, SCS assigned "dryland specialists" to the area staffs through the Power, Portneuf, Oneida, and Madison soil conservation districts. ASCS set aside funds for ACP "special projects" by which groups of dryland farmers could formulate an accelerated attack on conservation needs and receive financial help to get the job done. Conservation districts assigned special "dryland committees" in each district to coordinate the effort.

In the fall of 1965, erosion in the grain crop grew so serious that it forced farmers to harvest their fields up-and-downhill between uncrossable gullies. It took one farmer 4

Dryland fields get action in Idaho irrigation area

By Wilfried M. Hasfurth and George C. Welch

Agronomist and soil conservationist, SCS, Pocatello, Idaho

weeks longer than normal to harvest his crop. Yields, of course, suffered.

Diversion terraces seemed to be one answer to the problem, so farmers and conservationists toured similar lands in Utah where diversions had been tested and evaluated. These people came back determined to see if this practice would add to their conservation arsenal.

Although similar to the terrace systems long proved in the midwest, the diversions have differences owing to variation in the weather pattern of the area. While intense summer storms cause much of the severe erosion that damages the summer fallow land in the wheat fallow system, snowmelt is also a major factor. Heavy snowpacks occurring annually clog terrace channels with drifts that force the water over the

tops of the dikes during melting. Because of this snow problem and the broken, uneven terrain, terrace designs had to be radically changed and adapted.

Soil types play an all-important role in diversion design. Soils vary widely—from deep silt loams that soak away excess water rapidly to others with very tight subsoils that take in virtually no excess water. Since these two extremes may be found even in the same field, diversion design must rest on a detailed knowledge of the soils in each field.

In 1965, following harvest, the first diversions were constructed in the Power District west of Pocatello. The following spring's runoff tested them severely. Problem areas were studied and solutions planned. In 1966, the idea spread to other dis-

Diversion seeded to dwarf intermediate wheatgrass.



System gains with corn, soybeans

(Continued from p. 7)

his soybeans and small grain in a double-cropping system. He no-tills his soybeans in 20-inch rows in small grain stubble, using wheat, oats, and barley with equal success.

Last year he harvested wheat on June 21. His soybean planter followed immediately behind the combine and finished within 20 minutes after wheat harvest was completed. A herbicide was applied immediately after the soybeans were planted.

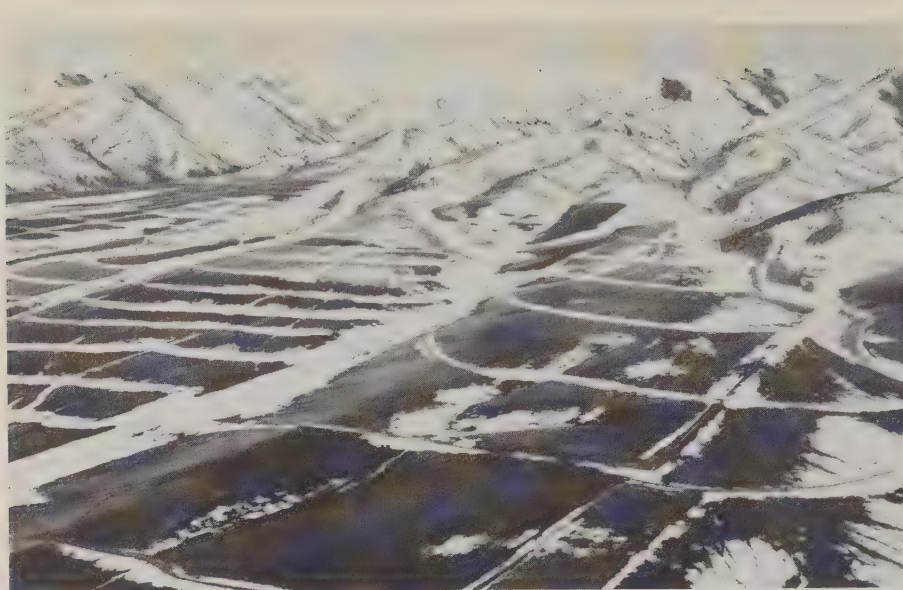
On September 12, Wade seeded oats by airplane for winter cover in the soybeans. A month later the soybeans were combined.

"We figure we save \$4 an acre when we use no-till," said Wade. "Also, we saved a lot of time in seeding and harvesting by using no-tillage on our soybeans and by airplane seeding our small grain."

In the development years of minimum tillage, farmers have shown their ingenuity in remodeling the corn planting equipment they already owned. At first they could not buy suitable minimum tillage equipment, and besides they had their own ideas on the changes needed in conventional equipment. The most satisfying thing about the remodeled equipment was that it worked and worked well. Much of this equipment is still in use.

In the beginning years, farmers using minimum tillage received help and guidance from district conservationists and conservation agronomists of the Soil Conservation Service. Now the University of Kentucky Agricultural Extension Service and the Soil Conservation Service both are working to advance the use of minimum tillage.

Kentucky farmers believe that the no-till methods of planting with correct use of herbicides are revolutionizing row crop farming more than anything else since the introduction of hybrid corn. ♦



Field south of Pocatello after conservation treatment suffered only slight damage from heavy winter runoff in 1969.

tracts in the dryland farming area.

In addition to diversions, strip-cropping, fall tillage, contour farming, stubble mulching, and minimum tillage are needed to reduce soil movement between the diversions, slow runoff, and hold down maintenance in the diversions and outlets.

The results of the coordinated program are now evident throughout the dryland area. More than 130 miles of diversions have been built. They have passed the experimental stage and are accepted throughout the region as a standard feature of the dryland landscape. Some 200,000 acres have been treated to a complete conservation system featuring all the needed practices. Erosion has been demonstrably curbed.

In the area south of Pocatello, county commissioners have spent many thousands of dollars annually to maintain a highway running at the base of the dryland foothills. Flash runoffs used to obliterate the road under a sea of mud and rocks at every heavy rain or snowmelt. Despite several severe summer storms that lashed the region in 1968, the county reports no road repairs were needed.

All the commissioners are enthusiastic in saying that the conservation effort is a tremendous benefit to the taxpayers of the county. ♦

Up to 200 tons per acre of soil loss was typical of the area in 1965. This is part of the same field shown on opposite page.



A multicounty resource development effort in 3 years has brought 666 permanent jobs to a 3-county area in northeastern Oklahoma and boosted the gross annual income more than \$4¼ million.

The Cherokee Hills RC&D Project was authorized for operations in July 1966. Since that time issuance of building permits has been increasing. Sales tax revenue in the area is up, bank deposits have almost doubled, and industrial payrolls have grown.

The boards of supervisors of three soil and water conservation districts —Adair, Cherokee, and Delaware counties — formed the Cherokee Hills RC&D Council which gained approval in November 1965 for planning assistance from the Department of Agriculture. The project

Better utilization of forest products is resulting in increased income in the project area. This firewood is being loaded for sale in the treeless panhandle of Texas.

A matter of payrolls and bank deposits...

Resource project spurs economic growth in Cherokee Hills area

By Harvey F. Chase, Jr., and Allen R. Moss

Chairman of the Cherokee Hills RC&D Executive Committee and SCS project coordinator, Tahlequah, Okla.

work plan now contains 184 project measures.

The economy in the project area is definitely on the move.

Jack Ross, Tahlequah mayor, tells of the confidence residents have in their area. "The city of Tahlequah is presently experiencing an annual growth rate of 11 percent." This reverses the national trend of declining populations in rural areas.

"Another good growth indicator," says Ross, "is the fact that the city

has issued \$1,200,000 in building permits during the last 13 months."

Sales tax revenues serve as a barometer of economic trends. Records show that sales tax revenues are up 41 percent in the area as compared to a corresponding period in 1962.

Increased construction has not been limited to the towns in the project. Frank Hornett, executive director of the Housing Authority for the Cherokee Nation of Oklahoma, ex-





plains, "We are in the process of building 400 new homes for Cherokee Indians. Fifty-six have already been completed. These homes have three and four bedrooms and are valued at an average of \$12,000 each. This work constitutes more than a \$4 million building program."

Two of the seven banks in the project area and one savings and loan office report that resources totaled \$30,844,087 as of April 30, 1969, compared to \$12,600,000 on the same date in 1964.

Tourist trade

The RC&D Project area is getting its share of increased recreation business. Al Williams, manager of an area grocery, reports, "The recreation and tourist trade between Memorial Day and Labor Day has increased the weekend volume at my place of business by 30 percent."

The beef cattle industry is another segment of the economy being stimulated by resource development. Increased pasture establishment, tick control research, and improved management of both pastures and cattle herds are all included in the effort.

Carl Greenhaw, co-owner of the Tahlequah Community Sale Barn, thinks improvements in the cattle industry are paying off. "We ran about 20 percent more cattle through our auction in 1967 than in 1964, and the quality of these cattle is definitely up," Greenhaw said.

As the development of natural resources receives more attention, the

RC&D project measures include diverse activities as training bulldozer operators (above) and constructing dipping vats (left) for tick control research of benefit to the cattle industry.

Improved quality and increased production of cattle result from the accelerated technical assistance, cost sharing, and loan programs available to farmers.





The RC&D project promotes Indian arts and crafts. Willard Stone displays his wood carvings. Construction (below) on watershed projects has resulted in 306 man-years of employment.



industries and businesses that process and sell the products of the land also prosper. The largest resource-based concerns in the area are poultry processing plants, wood products plants, nurseries, and canning companies.

Richard O'Brien, manager of O'Brien's Hillbilly Fryer Poultry Processing Plant at Jay, points proudly to his company's recent expansion. "Our new plant at Southwest City, Mo., 2 miles across the Delaware County line, employs 145 people. This plant and the plant at Jay employ a total of 290 people. We've doubled our plant capacity in this area in the last 4 years."

Water supply

A multiple-purpose reservoir constructed as part of a Public Law 566 project provides flood prevention and municipal water storage for the city of Stilwell. The assured water supply has permitted expansion of the Stilwell Canning Company. Its manager, Claude Todd, says, "Our payroll has gone from \$500,000 in 1965 to more than \$1,250,000 in 1968. When the sewer system we are now working on is completed, we will be able to add another 200 people to the payroll."

The Alabama Charcoal Company is benefiting directly from the work being done on improved utilization of forest products. Raymond Buzzard, manager of the firm, reports the volume of his business has tripled in the last 3 years.

The RC&D Project area is rich in Cherokee Indian history and tradition and is the site of the Cherokee Cultural Center. The four phases of the cultural center program include a Cherokee Village, which has been in operation for two summers; an outdoor amphitheatre; a Cherokee memorial; and the Cherokee National Archives.

When all four phases are completed, approximately 175 Indians will be employed. Marty Hagerstrand, general manager of the Cherokee Cultural Center, reports that about 30,000 people visited the

Cherokee Village, a replica of Cherokee life of about the year 1700, during the first season of operation.

Indian industry

The Cherokee Indian Tribe has also provided leadership in industrial development. Earl Pierce, chairman of the Provisional Authority of the Cherokee Tribe, enjoys telling visitors about the Cherokee Industrial Tract.

"We now have a restaurant, service station, arts and crafts center, and a Bureau of Indian Affairs office located on the Cherokee Tribe's property. Star-Cross Industry is now building its plant on the site. Star-Cross will employ 200 persons when in full operation."

Education levels are being raised in the Cherokee Hills through a broad vocational training program made possible through cooperation and grants of the Departments of Labor and Health, Education, and Welfare. Rural water districts, sewer systems, and water and sanitation programs are providing for a higher standard of living and a healthier labor force.

U.S. and State Employment Service figures show that unemployment rates are down an average of 2.4 percentage points from the level of 3 years ago.

The sponsors are optimistic of the future of the Cherokee Hills RC&D Project. Of 123 project measures activated to date, 38 have been completed, 45 are being installed, and 40 others are being planned. When all 123 measures are completed, it is estimated they will provide 4,956 man-years of employment for installation, and 3,721 years of continuing employment will follow completion. The increase in gross income to this area is estimated as \$27.2 million annually.

Federal, state, and local units of government join with private organizations and groups in assisting in the economic development of the project area. The slogan adopted by project sponsors, "Better use of what we have," is becoming a reality. ♦



The past brings new life to old farm in mountain recreation enterprise

By C. Donald Summers

District conservationist, SCS, Beckley, W. Va.

The 19th century has come back to Flat Top Mountain.

Less than 5 years ago, a small 48-acre farm lay abandoned on a plateau of Flat Top, only a few miles south of Beckley, W. Va. Now the farm is a thriving recreation area built around relics of the mountain country's past.

Dating back to pre-Civil War days, the farm has gone through production of farm crops, become idle land covered with poverty grass and running briars, and is now headed for a productive life again as a cooperator with the Southern Soil Conservation District.

"The General Store"

It is fronted by U.S. Route 19-21 and at the back by the West Virginia Turnpike. White plank fences and green pastures add a change in scenery for travelers on both highways. Many turnpike travelers detour to U.S. 19 just to get a closer look at the farm.

To take these visitors back to the days when settlers first made their homes in the hills, Mrs. Nancy Lee

Hutchinson opened an old time country store, constructed on a high point of the farm. The specialties are unusual and regional merchandise.

Even the road sign is a relic of the past. An old milk wagon was set up as the welcome sign announcing "The General Store."

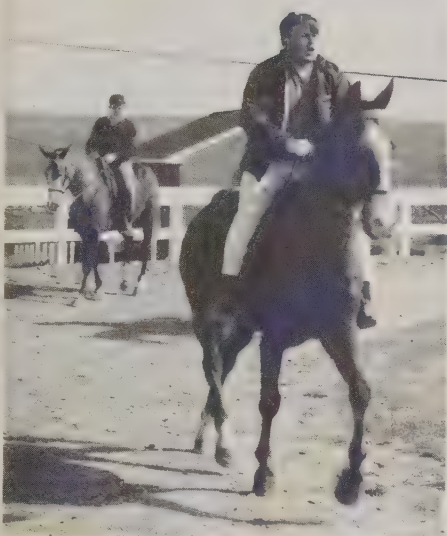
Collection of old buggies

Hugh is an avid collector of old buggies. He began reconditioning some of them at the farm. His hobby, along with his son Charles' interest in horses, led to the opening of a livery stable near Nancy Lee's store.

Since then one thing has led to others. Charles began breeding and raising Morgan horses. He and his dad combined the horses and buggies and began offering trail rides to the store customers. Two and one-half miles of trails were built. Following a plan developed with help from the Soil Conservation Service, the Hutchinsons built three ponds, planted trees for both beauty and wildlife cover, cultivated wildlife



Hugh and Nancy Lee Hutchinson in a buggy drawn by a Morgan stallion arrive at old-time country store. Hugh stands by the milk delivery wagon used as a welcome sign.



Two Beckley College students are taking riding lessons as part of the physical education class.

food, and installed draintile in the pasture area.

This island of early Americana includes an outdoor ring for teaching riding. Classes are offered to individuals, and in 1966 nearby Beckley College began utilizing the ring and stables for classes in horse-

manship. Located in an area known as the coldest spot in West Virginia, Charles was hampered in teaching the physical education class during the first year. He has now built an indoor ring for use during bad weather.

In 1967, Charles and his wife, Julia, opened the Cool Ridge Day Camp for children between 7 and 15 years old. Activities included archery, badminton, horseback and carriage rides, volley ball, aerial darts, arts and crafts training, and swimming taught by Julia in a heated pool. Five sessions were held and attendance, ranging from 28 to 54 each session, reached 186, much to Charles' pleasure.

Mary Hutchinson, a sister-in-law, taught the arts and crafts classes in a renovated farmhouse that dates back to pre-Civil War days. The setting is a natural for the crafts study with fireplaces and old-time

storage cupboards as a background.

The stable contains the usual tack room, feed room, and office as well as shower rooms for men and women. There is also a room for horsemanship classes. It has a picture window overlooking the large pond and the rolling countryside. Inside is a showcase and bar once used by a saloon in Oak Hill when liquor was legal in the state. It now serves as a display case for trophies and riding tack.

The Hutchinsons also cater small barbecue parties for groups. One such party was recently given for the cast of "Honey In the Rock." During the evening each member was treated to a ride in a buggy or carriage which would have been used by them in the historical days portrayed by the drama.

A recreation farm is not an easy business. Charles says, "It requires long hours and constant work. The day begins early and ends late. After visitors leave we still have horses to care for, equipment to clean and mend, and preparations to make for the next day. However, it is an enjoyable life, and we feel we are offering something which is needed in this area." ♦



Fish, fowl, and cows share multiple use of Creole country marshland

By Terry Clement

District conservationist, SCS, Cameron, La.

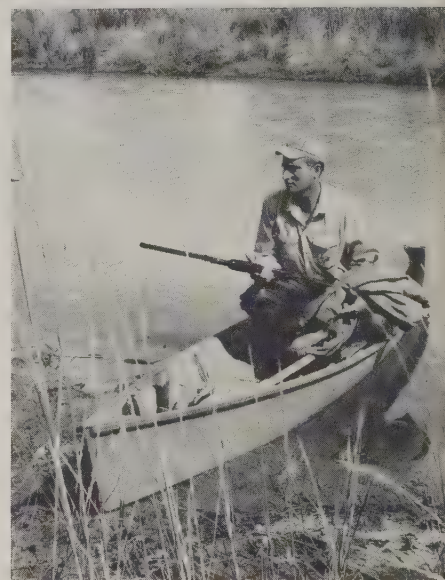
It's a chilly December morning in the brackish marsh of Cameron Parish, about 7 miles east of Creole, La. The scene is on the 7,000-acre tract belonging to the Mermentau Mineral and Land Company, Inc., of New Orleans. The sound of the brisk northeast wind is interrupted by the roar of motorboats bringing hunters back to camp with limits of mallards, pintails, teal, widgeons, gadwalls, and other ducks; some have limits of blue, snow, and white-fronted geese in their bags.

As the hunters return they pass a long string of high quality cross-bred cattle trailing into the marsh. The cattle are on a cattle walkway

—a specially designed levee that enables them to get into the marsh and eat their fill of marshhay cordgrass that grows in the same area where the hunters had been.

The marsh is control-burned every 2 to 3 years. Burning the rough grasses opens up areas for wildlife food plants, such as coast cockspur, saltmarsh bulrush, and others, to germinate and grow. Later burnings improve the quality of the cordgrass for cattle grazing.

Grazing and burning also open areas for waterfowl to feed in. Geese are attracted to the young tender grass. Small ponds or lakes within the marsh are resting and feeding



The marshland of the Mermentau Mineral and Land Co., Inc., serves as a multiple enterprise—ducks (above) feed on duck potato; hunter (center) returns from goose shooting; cattle (below) graze the marsh grasses.





Mrs. Richard Tabor, Herbie Legeune, Reggie Murphy, and Monique Tabor are catching the big ones.

areas for ducks, coots, gallinules, and other waterfowl. They feed on the widgeongrass and dwarf spike-rush that grow in the water.

In the distance, you hear the engines of the trappers' mudboats as they make their rounds. They are traveling in level ditches which provide travel lanes and open water for furbearers. The lanes go through areas of olney bulrush, saltmarsh bulrush, and other food plants preferred by muskrat and nutria. Traps are placed along the trails.

What is this, a sportsman's, naturalist's, trapper's, and cattleman's

paradise? No, but it's pretty close to it. This productive south Louisiana marshland resulted from an idea of the Mermentau Company's president, Edgar B. Stern, his associates, and Rancher D. Y. "Billy" Doland, Jr., to apply the multiple land use principle by developing the area into a top wildlife and cattle producing enterprise.

They became cooperators with the Gulf Coast Soil and Water Conservation District, and the Soil Conservation Service helped to develop a conservation plan. SCS conservationists made a wildlife and range

evaluation survey. A system of ditches, levees, and water-control structures was installed in 1963 for use in controlling the salinity of the water coming in from the Gulf of Mexico and to help maintain a favorable water level. Both are necessary to produce desirable natural food plants for cattle and wildlife.

Besides a water-control system the conservation plan called for practices such as cattle walkways, level ditches, proper grazing including seasonal use with the right number of cattle, wildlife wetland development, controlled burning, and brush control.

About 1½ miles of walkways, needed to distribute grazing, have already been constructed; 300 acres of brush (rattlebox) controlled, cost-shared by the Agricultural Stabilization and Conservation Service, and several miles of level ditches installed. More practices are planned.

"We are getting more ducks and geese each year," Stern said. "Last year we had about 120 man-days hunting with full bag limits. We hunt only on weekends. The marsh is now a better habitat for waterfowl and mammals that stay here throughout the year."

"My calf crop has doubled in size since the conservation plan was developed and the water-control system and other conservation practices were put in," Rancher Doland emphasized. ♦



Gates of inlet pipes on downstream side of control structure can be opened to let tidewater into marsh.

A blind farmer's tribute to land

Renovating pastures, constructing a pond, and digging drainage ditches are worthwhile accomplishments on any western Kentucky farm. But for J. C. Owen, blind since childhood, they are a tribute to his love of the land, especially his Cumberland River bottom land and hills.

"Most people make a living, but I live on what I make. Sometimes it's a hard way to go," said J. C., a cooperator with the Lyon County Soil and Water Conservation District.

Most farmers can see the results of their conservation endeavors, but J. C. has to listen and feel for them.

"We seeded this pasture in fescue and ladino clover," J. C. remarked as he ran his ultrasensitive fingers through the grass. "The clover is holding good, but it's grazed down now and the cows need to be moved to another field."

His sense of hearing is also uncanny. "I count 14 cows, 13 calves,

and a bull in this field," he said. The eye count showed the same.

J. C. and his brother, Chester, who is also a district cooperator and lives nearby, farm their 320 acres together; but J. C. lives alone and does most of his chores as well as his share of work on the farms. At present he is running 27 cows and seven sows in his cattle-feeder pig operation.

Most of his conservation work has been centered around developing and seeding 100 acres of pastures and meadows. He has also constructed 1,000 feet of drainage ditches which are now removing surface water from the lower bottom-land fields. A pond has also been constructed for livestock water. The Agricultural Conservation Program helped by cost-sharing the development of his pastures and meadows. —BOYD CHAMPION, *district conservationist, SCS, Cadiz, Ky.*

Wyoming

Trailer camp serves travelers, hunters

Convalescing from a heart attack, Charley (Bud) Spence noted day by day the hundreds of tourists who sped by on the highway along his property near Shell, Wyo.

Why wouldn't some of them like

to stop and camp in Shell Creek Valley not far from the mouth of rugged Shell canyon? he thought. Nearest campgrounds were in Greybull, Wyo., 15 miles away, and on top of the Big Horn Mountains beyond.

A cooperator with the Greybull-Shell Soil and Water Conservation District, Spence began to discuss plans for a trailer and camper court with SCS conservationists who helped him with his soil and water problems.

He installed 400 feet of tile drain, leveled the area, installed a concrete ditch along the side of the field for irrigation water, drilled a well for water supply, and planted grass and trees.

A private engineering firm designed the main campground to handle 50 camper units. A deluxe modern bath house, centrally located, is a welcome sight to weary travelers.

In the first year of operation, the camp served people from Canada and Mexico as well as from many parts of the United States.

During the slack season, Spence keeps busy guiding rock hunters from other areas. He is well acquainted with the geological formations in the Big Horn Basin.

As an added attraction, Spence offers big game and fishing guide service. Many hunters use the campground as a center for their hunting trips in the area.—ROY H. BUCHMEIER, *district conservationist, SCS, Lander, Wyo.*

J. C. Owen and pasture.



Charley Spence's Shell Creek camp.



Appalachian program boosts woodland efforts

Forest management in the Rutherford Soil and Water Conservation District, N. C., is getting a substantial boost from cost-sharing made available under the Appalachian Land Stabilization and Conservation Program (ALSCP).

Officials of the conservation district and the Rutherford Watershed Commission, as sponsors of a watershed program on the Second Broad River, determined that forest conservation was one of the principal land treatments needed. ALSCP funds were channeled largely into a 10-year woodland improvement project, now in its fourth year.

Principal woodland practices include tree planting and culling, brush removal, spot planting, weeding, and underplanting.

Crawler tractors clear land with specially designed blades that minimize soil disturbance.

Annual growth rates that were less than 2 percent before woodland improvement are now up to 7 or 8 percent in some areas.—H. J. CHERRY, JR., *district conservationist, SCS, Rutherfordton, N.C.*

Nebraska

Neighbors pool efforts to control floods

Twelve good neighbors in the Niobrara River basin are working together to keep Big Springs Creek from becoming a "big river" again.

David L. G. Willats, a cooperator with the Antelope County Soil and Water Conservation District, was the first to stop worrying and start working on the chief threat to his farm in Nebraska. After signing a Great Plains Conservation Program contract in 1965, he encouraged others to share the costs and benefits of flood control.

Three upstream neighbors signed contracts in 1966. By 1968, eight more men in the 20,000-acre watershed had joined them. Four other contracts are being planned with the assistance of the Soil Conservation Service.

But the creek didn't wait for the men to organize. During the past 4 years, it flooded twice, cut Willats' farm in half, and repeatedly damaged roads and bridges. In 1967, bridge repairs alone cost the county \$45,000 from one storm.

Willats and his neighbors have built 48 grade stabilization dams and plan to build 36 more with the help of Great Plains cost-sharing, the Agricultural Conservation Program, and private financing. Flood retarding structures and almost 2½ miles of diversions and terraces have been installed.

Owners were already using cropping systems, wind stripcropping and field windbreaks to protect cropland. Since the joint effort began, they have also planted grass and trees in gravelly draws and other problem areas common to the outwash plains around Big Spring Creek.

A driving rain still worries Willats and his neighbors, but they no longer need to imagine the worst.—ROBERT A. CHILVERS, *district conservationist, SCS, Neligh, Nebr.*

Louisiana

Precision land grading modernizes drainage

Sugarcane farmers in Crescent Soil and Water Conservation District of Louisiana improve water management and increase farming efficiency as they modernize outdated drainage systems with precision land grading.

Stan Rodrigue, manager of Goldmine Plantation and the ASCS county chairman, was the first cane grower in St. John Parish to try precision grading. He had seen the practice applied successfully in other parishes. With the help of the Soil Conservation Service he laid out an 11-acre trial field in 1963.

"Bigger blocks in precision graded fields allow me to use six-row equipment and spend less for labor," he says. "Weeds and Johnsongrass are less troublesome, too."

Rodrigue has graded 200 acres to date. He plans to apply the practice on his entire 1,080-acre plantation eventually. Cost-sharing under the Agricultural Conservation Program has given added incentive to this innovator and his neighbors. S. A. THIBODEAUX, *district conservationist, SCS, New Orleans, La.* ♦

Rodrigue and land-leveling equipment.

Vo-Ag boys plant loblolly pines in Appalachia.



Conservation frontiers for Conservation Society

Frontiers in Conservation" is the theme of the 24th annual meeting of the Soil Conservation Society of America to be held August 10-13 in Ft. Collins, Colo. The theme alludes to new techniques and accomplishments in conservation.

Some of the major topics to be presented in general session are "Conservation of Resources and Maintaining a Quality Environment," "Atomic Energy and 'Food Factory' Farms," "Conservation and Use of Water Resources," and "Use of Infrared Photography and Satellites for Resource Surveys."

The concurrent sessions include discussions on "Soil and Land Management to Meet Conservation Goals," "Water Resources Utilization and Management," "Wastes in Relation to Agriculture and Forestry," "Outdoor Recreational and Natural Beauty Needs and Opportunities," "Urban-Suburban Conservation," and "Utilization of Land to Meet Future Needs."

Four technical tours have been arranged—a 115-mile trip to Poudre Canyon; a 100-mile trip to Red-feather Lakes; a 61-mile watershed and irrigation tour; and a 15-mile tour of Colorado State University Foothills Research Campus.

Anti-science trend is topic of Biology Institute

The theme of the plenary session of the 20th annual meeting of the American Institute of Biological Sciences will be "Biology and the Anti-Science Trend." The meeting will take place August 17-22 in Burlington, Vt.

For the first time, the American Society of Animal Science and the Poultry Science Association will cosponsor a symposium on "Challenges in Living Systems" under the auspices of AIBS.

A session will also be held on

"Education in Biology," and a Refresher Conference on Animal Behavior Studies cosponsored by the Animal Behavior Society and AIBS will take place before the annual meeting.

Symposium on basin research

The International Association of Scientific Hydrology supported by the United Nations Educational, Scientific, and Cultural Organization will hold an "International Symposium on the Results of Research on Representative and Experimental Basins" at Wellington, New Zealand, December 1-8, 1970. Emphasis will be on analysis and interpretation of the research results on the basins (watersheds), rather than on organizing and running the experimental basins.

Host organization is the Royal Society of New Zealand.

Dates and places

August 3-6, National Farm and Power Equipment Dealers Association, San Francisco, Calif.

10-13, Soil Conservation Society of America, Ft. Collins, Colo.

17-20, American Agricultural Economics Association, Lexington, Ky.

17-21, Conservation Education Association, Arcata, Calif.

17-22, American Institute of Biological Sciences, Burlington, Vt.

19-21, Illinois Land Improvement Con-

tractors Association Soil and Water Conservation Show, Benton, Ill.

22-23, The Nature Conservancy, Seattle, Wash.

September

8-10, International Association of Game, Fish, and Conservation Commissioners, New Orleans, La.

10-12, American Fisheries Society, New Orleans, La.

14-16, National Sediment Conference, Washington, D.C.

14-19, American Parks & Recreation Society, Chicago, Ill.

14-19, National Recreation and Parks Association, Chicago, Ill.

14-19, National Conference on State Parks, Chicago, Ill.

14-19, National Therapeutic Recreation Society, Chicago, Ill.

14-19, Society of Park and Conservation Education, Chicago, Ill.

14-19, American Association of Zoological Parks and Aquariums, Chicago, Ill.

14-19, Armed Forces Recreation Society, Chicago, Ill.

21-24, American Forestry Association, Colorado Springs, Colo.

21-25, National Association County Agricultural Agents, Atlantic City, N.J.

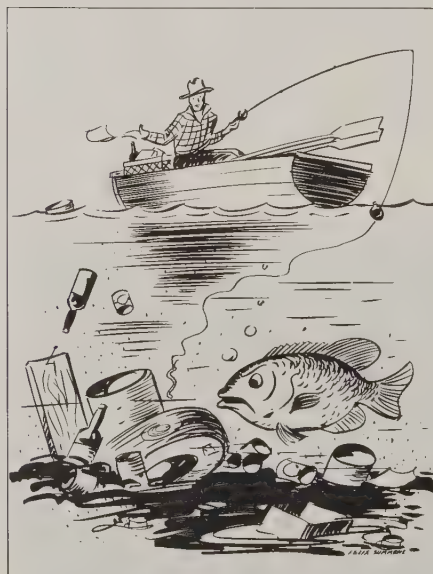
22-25, Farm and Industrial Equipment Institute, Boston, Mass.

28-October 1, American Bankers Association, Honolulu, Hawaii.

29-October 2, National Association of State Foresters, Portland, Maine

Fish farmers helped by many agencies

Many agencies provide assistance and services to fish farmers. The Soil Conservation Service offers technical assistance in pond and reservoir construction and in fish management. The Farmers Home Administration has a loan program for eligible fish farmers. The Agricultural Stabilization and Conservation Service offers cost-sharing assistance in the construction of reservoirs and ponds that can be adapted to fish farming. The Agricultural Extension Service provides informational and educational materials and services. The state game and fish commissions operate fish hatcheries and can be of help. The Fish and Wildlife Service operates fish hatcheries and a fish farming experiment station where various types of related research are conducted. ♦



"All this litter and he expects a bite!"

KAB-1



"Her soil is her fortune"

The city emblem of Belle Glade, Fla., includes a stylized picture of a farm conservation scene and the legend, "Her soil is her fortune." It appears, among other places, on the sides of police cars. ♦

Grant for water-sewer planning in Nebraska

A grant of \$317,080 to Nebraska has been approved by the Farmers Home Administration for comprehensive planning of water- and waste-disposal services in 74 rural counties of that state.

The grant will be administered by the Nebraska State Department of Economic Development.

The grant will assure statewide planning for modern water and sewer systems wherever they remain to be developed in the towns and countryside of rural Nebraska. Fifteen other counties previously have received grants totaling \$64,210.

Under the rural water-facilities program of the Farmers Home Administration, comprehensive planning outlines the orderly development of central water systems, sewer systems, and other waste-disposal facilities to serve rural areas including towns of not more than 5,500 population. Planning takes into account the need to insure effective use of water resources, avoid duplication of systems, and locate waste-disposal facilities so as to guard against pollution of water supplies. ♦

Review



People of Rural America. BY DALE E. HATHAWAY, J. ALLAN BEEGLE, AND W. KEITH BRYANT. 1968. U.S. Dept. of Commerce, Bureau of the Census, 289 pp.; maps and charts. \$3.50.

An attempt to better define rural America is made in a monograph issued by the Bureau of the Census in cooperation with the Social Science Research Council. *People of Rural America* is the third in a series of analytical and interpretive studies of the 1960 census.

The authors ask the question "What is rural America" and submit that "the entities described by the terms 'rural' and 'urban' have become confused and obscured" and that "it could be a serious error to assume that the sole or even primary function of many rural areas today is agriculturally oriented."

The study points out that in 1960 less than one-third of the population of the 48 mainland states was classified as rural. Within this rural population there were about three rural-nonfarm residents for every rural-farm dweller. A large part of the numerically dominant rural-nonfarm people, because of their varied occupations and residential locations, is inappropriately associated with the term "rural," the authors contend.

The proximity of rural communities to urban centers has had a marked economic and social effect on the rural population; those closer to urban job opportunities have a higher overall income and are more closely associated with urban community life. The growth and increasing importance of urban centers have continued to emphasize the dominance of the urban influence. The authors note that in 1960 more than half of the rural-nonfarm and over a third of the rural-farm population lived within 50 miles of a standard metropolitan

statistical area or an area of substantial urban concentration.

Many points amplified in the monograph, comparing economic, social, educational, and other opportunities in rural and urban areas, have long been known. The study offers, however, further valuable insight into the influence, or infringement, of urban life on rural America, and the resultant change in the social and economic structure of the rural population.

The authors suggest a reclassification of the population, dividing the rural category into village and open country for both metropolitan and nonmetropolitan counties, with adjusted population limitations to include more urban concentrations in standard metropolitan statistical areas, as "more descriptive of the residence pattern of the American population."

"It is evident," the authors conclude, "that changed social and economic conditions and needs call for re-examination and change in definitions . . . that . . . recognize the present and future realities of rural America."—JAMES MILLER, *Information Division, SCS, Washington, D.C.*

Natural Areas in Indiana and Their Preservation. BY ALTON A. LINDSEY, DAMIAN V. SCHMELZ, AND STANLEY A. NICHOLS. 1969. *Purdue Univ., Lafayette Ind.* 594 pp., illus. (No price).

A carefully documented account of the remaining natural areas in Indiana eloquently makes the point, without actually saying so, of how little remains of the original landscape in our more populous agricultural states.

The authors visited and observed several hundred localities that might have been well enough protected to qualify as true natural areas. Of these, they describe 162 that they feel are worth setting aside as nature preserves. These comprise a little over 14,000 acres in a state that contains 23,226,240 acres.

By and large the 162 locations are scraps and remnants of original con-

ditions, measuring from a half acre to 100 acres or more in size. Only a few are as large as 600 to 800 acres; two contain 1,000 and 1,200 acres respectively.

Bogs, marshes, lakes, dunes, and forest remnants are described. A single 450-acre tract of tallgrass prairie is mentioned in the appendix; this appears to be what is left of the original prairie that may have covered 3 million acres 150 years ago. The location of this area is not given; undue publicity, the authors feel, might result in making the tract difficult to acquire as a preserve.

At the time of publication in April of this year, two of the natural areas were under legal protection of the state. Twenty-nine other tracts are protected by various nonstate organizations. All 31 areas comprise 2,450 acres. This is all.

Do other states do better?—**WILLIAM R. VAN DERSAL**, *Deputy Administrator, SCS*.

New Publications

Effects of Surface Mining on Fish and Wildlife in Appalachia. BY JOSEPH A. BOCCARDY AND WILLIAM M. SPAULDING, JR. 1968. U. S. Dept. Int., *Bur. Sport Fisheries and Wildlife, Resource Publ. 65*. 20 pp., illus. \$0.35. Report of a field appraisal team that examined selected areas in eight of the 10 states designated by the Appalachian Regional Development Act of 1965. Team members represented the Bureau of Sport Fisheries and Wildlife, Bureau of Mines, Geological Survey, Forest Service, Federal Water Pollution Control Administration, and the Soil Conservation Service. Observations cover existing conditions, importance to fish and wildlife resources, and accomplishments in restoration for each state. The report concludes that "reclamation as currently practiced in the Appalachian Region does not adequately restore mined lands to minimal standards necessary to protect and improve fish and wildlife resources."

Natural Resources of Maryland. 1969. U.S. Dept. of Int. 54 pp., illus. \$0.75. Twenty-first in a series of reports on the natural resources of the states, this one emphasizes the historical tradition of the Old Line State and the contrasts presented as a meeting ground of the North and South.

Chapters devoted to the history, physical characteristics, fish and wildlife, agriculture and forests, parks and recreation, Indian heritage, and mineral re-

sources of Maryland provide interesting reading for both resident and tourist.

The Forest Service, Soil Conservation Service, U.S. Army Corps of Engineers, and state conservation agencies have contributed to the booklet. Programs of federal natural resource agencies for Maryland are outlined.

Major Uses of Land and Water in the United States With Special Reference to Agriculture. BY H. THOMAS FREY, ORVILLE E. KRAUSE, AND CLIFFORD DICKASON. 1968. *USDA Agr. Econ. Rpt. 149*, 74 pp. Continuing the series on the major uses of land and water in the United States published at 5-year intervals by the Economic Research Service, this is the summary for 1964. It gives official statistics on the extent and distribution of land used for crops, pasture and range, forest, and other purposes. Acreages irrigated and dry-farmed, acreages drained, and other information on water-use practices are also included.

Agricultural Utilization of Sewage Effluent and Sludge. BY JAMES P. LAW AND ROBERT S. KERR. 1968. *U.S. Dept. of Int., Federal Water Pollution Control Admin.* 89 pp. \$0.45. An annotated bibliography.

National Parks and Landmarks. (1969) U.S. Dept. of Int., *National Park*

Service. 127 pp. \$0.55 Two hundred sixty-three areas totaling 28,061,920 acres administered by the Park Service and related properties as of January 1, 1968, are listed and briefly described.

Soil surveys

Ben Hill and Irwin Counties, Georgia. BY JOHN W. CALHOUN AND GARNET J. WOOD. 1969. 63 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by John W. Calhoun, Joe G. Stevens, and Winfield S. Carson.

Cass County, Iowa. BY W. M. JURY, R. I. DIDERIKSEN, AND C. S. FISHER. 1969. 80 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by W. M. Jury, L. A. Clark, R. I. Dideriksen, J. R. Nixon, I. D. Persinger, M. A. Sherwood, and J. A. Phillips.

Barren County, Kentucky. BY EARLE E. LATHAM. 1969. 85 pp.; maps 4 inches to the mile (1:15,840). Soils surveyed by Earle E. Latham, Arlin J. Barton, Ronald D. Froedge, and James W. Dye.

Bulloch County, Georgia. BY HERSCHEL L. PAULK. 1968. 75 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by Herschel L. Paulk, Jack R. Brown, and Daniel D. Monts.

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Hawaii

USDA SOIL CONSERVATION SERVICE

NATIVE-BUILT TERRACES WHERE RICE AND TARO GROW, EAST KAUAI SOIL AND WATER CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each state, Puerto Rico, and Virgin Islands—are available from the Superintendent of Documents for \$0.10 each or \$5 for set of 52. Obtain order blanks from your local SCS or post office.

From the Administrator:

Conservation ever changing

Conservation and conservation concepts are an ever-changing thing in light of new technology and farming methods. Constant vigilance is required to shed the habits of yesteryear and bend with these rapidly changing times

The conservation system designed for the equipment and farming methods of the forties may not meet the needs of today. Farming today is a complex operation. It is based on the best use of efficient machines and scientifically tailored materials to prepare the land, plant, mature a crop, and harvest it with the least amount of scarce labor. Machinery becomes larger, faster, and more expensive. The eight-row planter and cultivator; the giant self-propelled combine; and the large vegetable and fruit harvesting machines require fields and conservation systems which lend themselves to efficient, high speed operations.

A conservation system, even though it may control erosion and runoff, or provide for orderly water management, is not acceptable if it does not provide for efficient use of modern equipment.

Basic principles of conservation learned through the years are still sound. These principles are being woven into new systems of conservation that meet the needs of the modern land user.

Size and shape of fields are being changed to better fit the farming methods. The topography in many cases is altered by land grading. This is done to permit installation of workable erosion control systems; to provide smoother fields for large equipment; to permit more uniform application of water, or more orderly removal of excess water. In some fruit and vegetable producing areas land grading is being performed to provide better air drainage for frost protection.

Adequate access roads and bridges are now an integral part of a conservation system to permit efficient movement of farming equipment and transporting of supplies and harvested crops.

New materials are integrated into conservation systems as they are developed and

proved suitable for use. The day of automated irrigation systems is here.

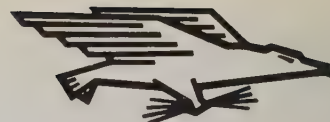
More use of fertilizers on crops and chemicals for insect and weed control are requiring changes in cropping methods and conservation systems. In many places surface water-disposal systems are being placed underground since herbicides and vegetated waterways may not be compatible.

The effect of conservation on improving the quality of the environment is becoming increasingly important. Conservation systems that reduce runoff and erosion simultaneously reduce the movement of sediment and other pollutants into our rivers and lakes.

Many of the standard conservation practices and techniques, with slight adaptation, are playing an increasingly important role on lands used for other purposes. These include such things as control of erosion and sediment from urban areas, management of runoff and by-products from concentrated livestock operations and agricultural processing plants, and control of runoff from eroding road rights-of-way. These all have a place in improving the environment, enhancing esthetic value, and making America a better place for all citizens to work and live.

The modern conservationist and land user must be ever alert and willing to adjust in these rapidly changing times.

Kenneth E. Grant



If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.



Miss Vera Snyder, member of the teaching staff, explains to the children the growth of just a few of the plants donated to the outdoor education school by the SCS Plant Materials Center, Los Lunas, N. Mex.

Children flock to outdoor education Center in New Mexico mountains

About 10,000 elementary school children visited the Outdoor Education Center of the Albuquerque Public Schools during the past school year.

Public and parochial children attend on a rotating basis. The center, located on the east slope of the colorful Sandia Mountains, has a regular staff, and its whole operation is made possible by Federal funds under title 3 of the Elementary and Secondary Education Act.

Although the Albuquerque Public School system administers the center, pupils and teachers from private schools are frequent guests.

Jack Malloy, member of the teaching staff, said, "Our goal is to acquaint the children with the natural environment in the area, see if we can arouse their interest, and make them aware of their responsibilities in relation to the environment."

He was amazed how city children become interested. For example, he said, they are interested in the problem of smog and come to realize that smog respects no political boundaries in its effect on residents.

Malloy described the center program for the children, most of whom are sixth graders.

"It actually involves briefing in

the classroom on geology, vegetation, and the effect of man on the area, and best of all a hike into the foothills," he said. "We take the children through canyons and wooded areas and work on the many features we find. We have to guide the children because they could miss things. They are not used to observing."

Some conservationists have found real pleasure in tagging along on some of these tours and listening to the questions and comments.

One of the features of the area is a weather station for measuring wind and precipitation. The center has nature trails and shows examples of good conservation of brush and grass. Some erosion has been left to indicate what should have been prevented. Sometimes there is wildlife—squirrels, deer, chipmunks, and rabbits.

Summer programs are also being planned. Soil Conservation Service conservationists have helped prepare a master plan for the site that tells where various features are and what is needed for soil conservation.

The Plant Materials Center in Los Lunas donated various plants for landscaping and nature trails.

Because of the success of the program, other school systems in New Mexico are planning similar enterprises. ♦

Sediment control

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Strip-mine restoration, p. 29
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In a "new town," p. 35

Soil Conservation Service
U.S. Department of Agriculture

Soil **Conservation**

Devoted to the wise use of land and water resources

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CURRENT SERIAL RECORDS



Public officials and conservationists will be in Washington this month to give concerted attention to sediment problems (p. 34).

So it is timely that we have as guests in our magazine municipal experts actively dealing with sediment.

SCS Geologist John Roehl arranged through the American Water Works Association for the article on silt in water supply (p. 31). Kansas City water works men, Glen J. Hopkins and J. Robert Popalisky, reveal some aspects of water treatment that many soil conservationists may not have thought of before.

El Paso Public Works Director P. G. Dieter, Jr., joins our district conservationist, there, Richard Reed, in describing that city's extensive sediment-control works (p. 33).

New town

All the erosion and runoff problems that beset urban developers individually combine to plague the builder of a complete "new town," such as Columbia, Md.

SCS Conservationist Elmer Sauer has worked with the company's planners and engineers on the ground from the beginning. Our staff writer, Charlotte Conrad, and visual information specialist, Gene Alexander, visited the development and helped Sauer and SCS Geologist John Holeman tell how sediment control measures are being integrated into Columbia's operations (p. 35).

COVER: The pattern of dried and cracked mud is a familiar sight in streets and streambeds below unprotected building sites.



Soil Conservation

Devoted to the wise use of land and water resources

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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*"This is public land—your
land and mine"*

Road cuts and fills can be
promptly stabilized with
vegetation; in this case
crownvetch was used.



Roadside erosion survey

Secondary roads account for most of sediment
pollution coming from Wisconsin highways

By William M. Briggs

Conservation agronomist, SCS, Madison, Wis.

The eroding sections of Wisconsin roads, if joined end to end, would extend from the capital city of Madison to New York city, then back across the continent to Los Angeles.

This isn't to say that Wisconsin has more roadside erosion than any other state but that conservationists here have made a systematic survey of the situation and can name places and cite figures.

The inventory shows something more than 21,000 sediment-producing sites on the state's 87,000 miles of roads—a total of 3,711 miles of bare banks in an average of four locations in each mile. Figuring an average width of 16 feet, their com-

bined area amounts to nearly 7,300 acres.

This is public land—your land and mine! Much of it drains directly into lakes and streams. For many years, students of sedimentation have recognized roadside erosion as one of the principal sources of the material progressively filling and fouling our surface waters. The survey gives a clear picture of the problem in this state. The inventory is believed to be the first of its magnitude in the Nation.

The Wisconsin Chapter of the Soil Conservation Society of America initiated this project in 1967. A subcommittee of the Natural Resources Council of State Agencies drew up procedures for a 100 percent inven-

tory of all rural roads in Wisconsin.

Each county organized a local committee. Participating personnel and agencies included the Soil Conservation Service, Extension Service, Forest Service, Wisconsin Department of Natural Resources, Wisconsin Department of Transportation, Wisconsin Department of Local Affairs and Development, soil and water conservation district supervisors, County Agricultural Stabilization and Conservation Service committees, and county officials of Farmers Home Administration. Other local, state, and federal agency people frequently helped. The SCS district conservationist generally served as chairman. A number of county Technical Action Panels

Roadside Erosion and Control Needed in Wisconsin

Control needed	Town Acres	Roads Percent	County Acres	Roads Percent	State Acres	Roads Percent	All Acres	Roads Percent
Fertilize, seed, and mulch	2,640	50	1,130	64	150	69	3,920	54
Slope, fertilize, seed, and mulch	2,140	40	490	28	50	22	2,680	37
Structure, slope, fertilize, seed, and mulch	520	10	150	8	20	9	690	9
Totals	5,300	100	1,770	100	220	100	7,290	100

(TAPs) chose this as a special project.

Tabulations for each eroding area included length, width, and total area in square feet. Surveyors marked each location in a plat book now filed in SCS work unit offices. Compilations by townships were sent to the state committee for checking, then the information was summarized on a county and state basis.

Town and county roads account for 97 percent of all roadside erosion. Nearly three-fourths (73 percent) occurs along town roads; one-fourth (24 percent) along county roads; and the remaining 3 percent along state roads. Vegetation along state roads generally rates excellent.

The published report gives a state summary and a breakdown of the findings by counties. Tables include extent of erosion along roads—town, county, and state. One table ranks the 15 counties with the most erosion. It shows that one-third of all roadside erosion is found in six counties, and more than half occurs in 15 counties.

Persons making the inventory indicated the control needed on each

eroding site. Total figures show that more than half (54 percent) of the sites could be controlled by fertilizing, seeding, and mulching. More than one-third (37 percent) requires sloping, fertilizing, seeding, and mulching. The balance or nine percent needs "the works" including structures, sloping, fertilizing, seeding, and mulching.

Only areas of more than 100 square feet were recorded. The figures, therefore, do not represent all of the roadside erosion. The committee prepared individual county supplements for town and county officials. These tabulate erosion along town, county, and state roads on a legal township basis.

Local news media publicized the survey widely and created an awareness of the problem. People and organizations have started an "action" program. Soil and water conservation districts are recognizing roadside erosion in their work plans. Districts and counties are purchasing hydroseeders and mulchers. Several counties and townships are developing policies for proper control of roadside erosion.

The report, distributed widely, urges local, county, and state officials to take corrective action as soon as possible. Recommendations include:

(1) Develop action programs giving consideration to adopting time-tables for achieving adequate control.

(2) Consider purchase and use of specialized seeding and mulching equipment.

(3) Within the next 5 years, control every site reported that is a major source of sediment in Wisconsin's surface waters.

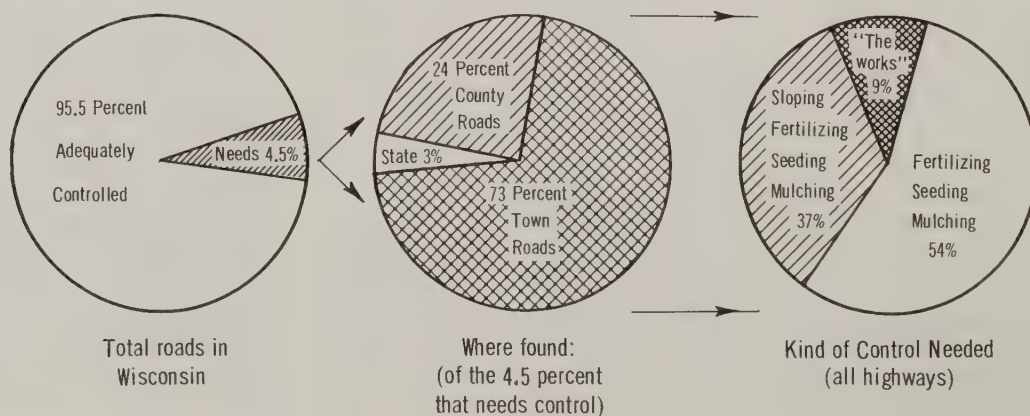
(4) Consider incentive funds of some sort, including any available for public works, as a way to help speed up roadside-erosion control.

(5) Establish vegetation on all newly constructed road cuts and fills. Waiting for natural seeding is too slow. Provisions should be made to secure wider rights-of-way where needed.

(6) Build sediment-retention structures as a part of all new construction. Maintain them until permanent structures and vegetation achieve adequate control.

The time of gathering data proved opportune to collect other pertinent information. Local committees outlined selective brush management sites suitable for maintaining highway rights-of-way in native shrubs. They also recorded unsightly conditions, including dilapidated buildings, auto graveyards (three or more cars), and dumping grounds. These items were reported separately. ♦

IN A NUTSHELL:



Backwall of open pit vanadium mine (right) and spoil pile are challenge to conservationists.



From open pit mines to grass and pines

By Kipp B. Sullivan

Area conservationist, SCS, Little Rock, Ark.

Mounting concern for land left in ruins and streams polluted with sediment from surface-mining operations is engaging the attention of mining companies as well as the state and federal governments. Among the companies taking voluntary conservation measures to reduce these public hazards is the Union Carbide Corporation.

Each mining operation differs and corrective action varies, but the objective is to return, within practical limits, the maximum portion of mined surfaces to productive use.

Restoration work proceeds along with extraction at Union Carbide's open-pit operation near Hot Springs, Ark., where the company is recovering a low-grade vanadium ore. Con-

servation work under the direction of Chief Mining Engineer H. J. Monteith started as soon as waste dumps reached planned heights.

Vanadium is a steel-white metal that is quite common in nature but does not occur in the pure state, as gold, silver, and copper sometimes do. Although abundant, it seldom occurs in deposits rich enough to be mined and processed economically. The Hot Springs operation is the only major one in the United States being worked for vanadium alone.

Vanadium compounds added in small quantities, to steel impart strength, toughness, hardness, and resistance to impact and abrasion. The metal serves as a catalyst in the production of synthetic rubber

and in the manufacture of sulfuric acid. It is used as a cracking agent in petroleum refining. In pure form it may find uses in space vehicles because of its high temperature resistance characteristics.

The soft, clay-like ore contains approximately 1 percent vanadium oxide, producing only about 20 pounds of the metal from each ton of ore mined and processed. In addition, several tons of waste must be dug for each ton of ore. The deposits are such that all of the ore and waste must be removed from the open pits and the unusable material deposited in spoil piles outside the excavation. And it accumulates at an astonishing rate.

Mining Engineer Monteith's first

objective in instituting conservation procedures was to reduce the unsightly aspects of the piles and his second was to put the area to a productive use. Since the area covered by the spoil originally grew a mixture of shortleaf pine and hardwoods, he reasoned that pine timber would be the best long-range cash crop.

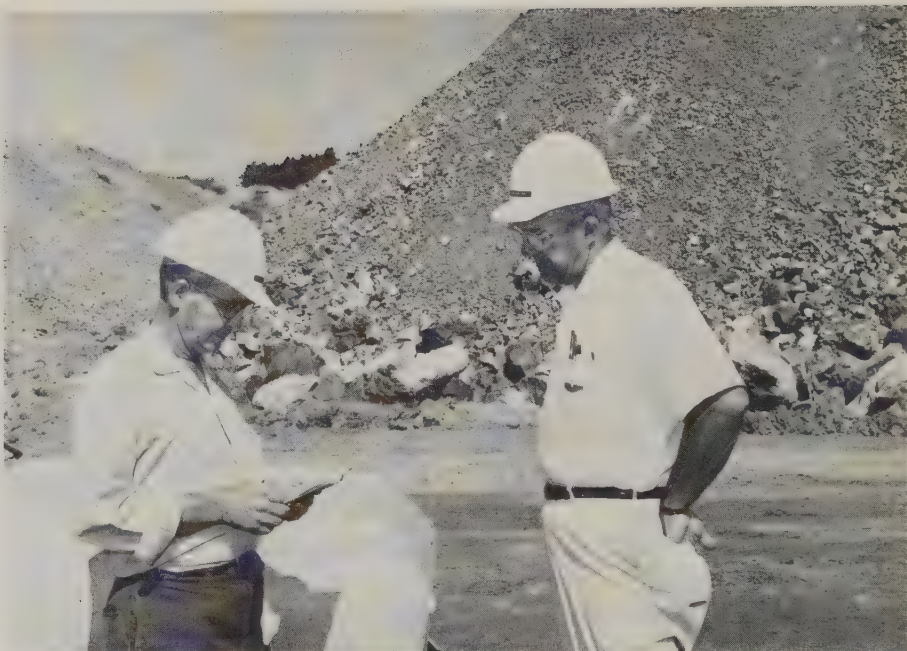
Monteith recognized that it would be necessary to stabilize the area as soon as possible to prevent excessive erosion while the trees were getting established. This posed a difficult problem because the piles are made up primarily of subsurface material mixed with vast quantities of unweathered rock and shale that contain little available plant food. The texture and composition of the material also limit storage of moisture.

On the advice of Soil Conservation Service conservationists assigned to the Lake Hamilton Soil and Water Conservation District, Monteith chose weeping lovegrass for the initial cover and stimulated early growth with 400 pounds of 10-20-10 fertilizer per acre. Smoothed tops and side slopes of the spoil piles were seeded with excellent results. In the following winter shortleaf pine was planted on 8-foot spacings.

Surface-mining operations often cause problems for wildlife through the destruction of plants used for food, cover, and nesting. Lovegrass and pine will make up for some of the loss, but the company is also planting slopes to autumn-olive, an ornamental shrub that produces large quantities of berries favored by at least 25 species of birds.

The engineer also knew that mining operations speed runoff and erosion and he feared that sediment would pollute Lake Catherine with adverse effects on swimming, boating, and fishing. So he had a series of silt basins and dams built above and in the stream that carries runoff to the lake. As basins fill with silt, they are dredged to restore their effectiveness.

To date, the company has established an effective cover of lovegrass



Above, Chief Mining Engineer H. J. Monteith (left) and Personnel Manager Jack Hamilton for Union Carbide's vanadium mine stand in front of growing mountains of mine waste. Below, SCS District Conservationist Earl D. Chapman (left) with Monteith stand more than 100 feet above natural ground level as they check second year growth of weeping lovegrass on leveled spoil.



and pines on 15 acres of mine waste. The built-up area is now more productive than the land underneath was in its native condition. When the ore is exhausted, some 200 acres of mine spoil will have been rehabilitated. The remaining pit eventually will fill with water and offer possibilities for wildlife and recreational development.

Monteith says that cost of mine

waste restoration is not a major factor. It should be considered just another part of the mining operation because "we owe this much to the community." If it is done as the work proceeds, while labor and equipment are available, it costs much less than it eventually would if waste were allowed to accumulate.

"And sooner or later the job must be done," he says. ♦

Problems of silt in public water supplies

By Glen J. Hopkins and J. Robert Popalisky

Director of Water Department and chief of Division of Water Purification, Kansas City, Mo.

Silt is widely recognized as a pollutant of water and one that can be of considerable importance to public water supplies.

Some persons believe that elaborate water-treatment facilities would be unnecessary if the silt content were comparable to the natural state when the native Indians were the only inhabitants of our watersheds. As a matter of fact, however, in some areas of the country, and particularly in the Missouri River, the silt concentration then may have equaled or exceeded present levels.

Perhaps the dominant influence of silt on water supply, municipal or industrial, is its encroachment on the storage capacity in water-supply impoundments.

Loss of storage capacity

Silt, as defined in this article, is "mineral particles intermediate in size between those of sand and clay." Erosion of upstream land causes silt to enter the impoundment as suspended matter carried by storm water along with the coarser sands and finer clays. As the velocity of the flowing water is reduced on entering the impoundment, the heavier particles settle quickly. Mudflats appear first in or near the coves formed by tributary water-courses. The smaller and lighter particles are carried farther into the reservoir, so that the entire bottom may be blanketed by silt deposits. The effective storage capacity of the reservoir is progressively reduced.

Equally important, if not more so, is the reduction in depth. During

a prolonged drought, evaporation may cause much greater loss of water than does actual use by the municipality or industry. As the ratio of surface area to volume becomes less favorable, a larger percentage of stored water is evaporated.

During drought periods many municipalities have suddenly faced severe water shortages because their water storage had been drastically depleted by sediment accumulated in their reservoirs.

In the water-treatment plant, silt presents many problems and assumes a role quite different from that in the storage reservoir. Obviously, silt must be removed before the water is suitable for use. Yet the silt particles perform a useful function in some of the treatment processes.

The great variations in settling properties of sediment particles of different sizes and mineral composition greatly influence the design and operation of purification plants processing surface water. The treatment necessary to remove silt may vary from gravity sedimentation (settling) to very complex processes, depending upon the amount and character of the silt present.

Carrier of other pollutants

Silt suspended in water may serve as an effective adsorptive agent for certain pollutants in solution. This adsorptive capacity increases with the surface area of the particles.

The adsorption of organic matter in solution is an exceedingly complex phenomenon, depending on

such factors as the nature and concentration of the organic matter, the size, amount, and type of silt, and on temperature, time in contact, and other features.

The organic matter commonly absorbed by silts includes the suspended long-chain fatty acids, the higher order alcohols, and other products of plant and animal life which surface wash carries into a stream. These substances cause bad tastes and odors in water supplies. To the extent that they are removed as the silt settles out of the water, silt is an asset rather than a liability to water treatment.

Silt removal

Methods of removing silt to clarify water date to 2000 B.C. The ancient Egyptians allowed turbid waters from the Nile merely to settle

"... sound land management and good soil conservation practices are vitally important to communities and industries using reservoirs as a source of water supply."

for clarification before consumption. Some facilities for water storage and silt removal built by the ancient Romans in Jordan and other middle eastern countries are still in use as a source of drinking water by residents of rural areas.

Modern methods of silt removal and treatment of silt-laden water have become as complex as the silt itself. Purification of silt-laden waters for human consumption poses many problems. Of necessity, the finished water must be free of suspended material and appear clear to the user to be esthetically acceptable. Even microscopic, colloiddally suspended particles must be removed; for viruses, bacteria, and other undesirable constituents may be adsorbed on their surfaces.

The larger and heavier silt particles settle readily as the water is brought to a quiescent condition. The extremely small particles, however, are not removed by sedimentation and more elaborate treatment methods must be used.

Filtration was employed in ancient Greece and is still one of the leading methods for removing silts of small particle size, but it, too, falls short of complete effectiveness. Coagulation, flocculation, precipitation, and filtration must be employed successively to insure complete removal of particulate matter and fully reliable purification. In practice, all of these methods are commonly employed.

A flocculating agent

Silt particles play a very important and necessary role in the flocculation process. They provide nuclei around which masses of gelatinous material accumulate to form large particles that settle quickly, removing extraneous materials from the water. In actual operation, some plants processing water of low turbidity have found it advantageous to add some silt as an aid to the process of coagulation-flocculation.

The large reservoirs on the upper Missouri River and on principal tributaries have markedly reduced the silt content of the river water.

The residual silts are principally of small particle size, and do not settle readily. As a result, the primary sedimentation basins at the Kansas City, Mo., water-purification plant no longer serve a useful purpose most of the time. Kansas City is now adding facilities for a third stage of chemical applications, mixing, coagulation, and flocculation as a part of its modernization program. These improvements will be installed ahead of the existing primary sedimentation basins and will restore these units to useful service.

The problem of sludge

Settled materials removed from waters by sedimentation alone or in combination with coagulation are known as "sludge." Sludge often consists of silt particles in combination with the hydrated coagulants and the partially oxidized organic matter removed from the water in the processes. In many instances, this sludge cannot be returned to the stream from which it was taken and must be disposed of by lagooning, dewatering, and landfill, by recalcining in the case of lime-soda softening, or other methods. Each of these methods is expensive, and some pose problems as complex as the actual removal of the silt.

Facilities for silt removal frequently represent a substantial addition to the capital cost of water-treatment facilities and add to the cost of maintaining and operating treatment works. If the silt load is variable, equipment and chemical application must be adequate to handle the maximum silt load even though it occurs only infrequently.

For the Missouri River, a stream of moderate organic pollution and heavy silt pollution, three stages of chemical application for coagulation-flocculation are desirable ahead of sedimentation, disinfection, stabilization, and finally filtration. While such facilities are quite expensive, both in capital and operating costs, it is rather doubtful that either construction costs or operating costs would be materially reduced if silt

concentrations were lowered since such silt reduction would allow greater penetration of sunlight resulting in increased algae growths.

Watershed management

Although reduction of the silt load in the source of public water supplies may bring some additional problems and costs in water treatment, this is no argument for allowing erosion and sedimentation to dissipate necessary storage capacity in reservoirs. Watershed management and good soil conservation practices over the contributing drainage area can do much to prolong the useful life of any impoundment.

In most areas it is quite difficult for a community or industry to gain control of a watershed large enough to yield an adequate supply of water and to construct a reservoir large enough and deep enough to store enough water to last through a prolonged drought. Good reservoir planning can be negated if changes in land use cause a significant increase in erosion. Large volumes of silt can accumulate in the reservoir in a very short time, with little or no warning to the municipality.

The large reservoirs on the Missouri River include millions of acre-feet of capacity reserved specifically for the storage of sediment, adequate for a period of 100 years or more. This additional storage is very costly, but the investment is an absolute necessity.

Comparable need exists for extra capacity for sediment storage in the much smaller reservoirs constructed for water-supply storage. Small communities usually cannot finance water-supply reservoirs that have a 100-year useful life, and reservoir sites are seldom available for economical development of such increased capacity. In the absence of storage adequate for long range water-supply needs, sound land management and good soil conservation practices are vitally important to communities and industries using surface reservoirs as a source of water supply. ♦

People detouring around mud filled streets; weary city maintenance crews working around the clock to reopen streets to traffic; distressed residents shocked because their homes and yards were filled with mud.

That was the situation in parts of El Paso, Tex., in July of 1968 after a 6-inch downpour fell in 12 hours. Meanwhile in other parts of town, streets, homes, and businesses were not damaged by the storm, thanks to flood-control and sediment structures built by the city of El Paso.

Much of El Paso is located on the flood plain of the Rio Grande River and on the sandy sloping land below the foothills of the backdrop of mountains to this desert metropolis. A system of 39 detention dams with a total storage capacity of 4,955 acre-feet was installed to intercept runoff from the higher ground before it could drop its sediment load on the streets and lower areas of the city.

The dams were made possible by funds from two bond issues, one in 1958 and another in 1964, which authorized expenditures of \$7 million. The city received no federal or state financial aid.

Since El Paso has a bright future

Texas city builds its own sediment-control system

By P. G. Dieter, Jr., and Richard W. Reed

Director of public works, city of El Paso, and district conservationist, SCS, El Paso, Tex.

for growth, additional planning has been done. The regional planning agency for El Paso County, the El Paso Council of Governments, has prepared a general land use plan, based in part on a soil survey provided by the Soil Conservation Service. The City Planning Department likewise has prepared a "planning atlas." These documents call for land use patterns that will reduce flooding and sediment damage to future developments.

The city also plans a flood-plain ordinance to reduce sediment and flooding damage in areas yet to be developed. The proposed ordinance will augment the present zoning ordinance to control undesirable land-development patterns.

The city has been working with the U.S. Army Corps of Engineers for flood and sediment control in the central and northeastern portions of

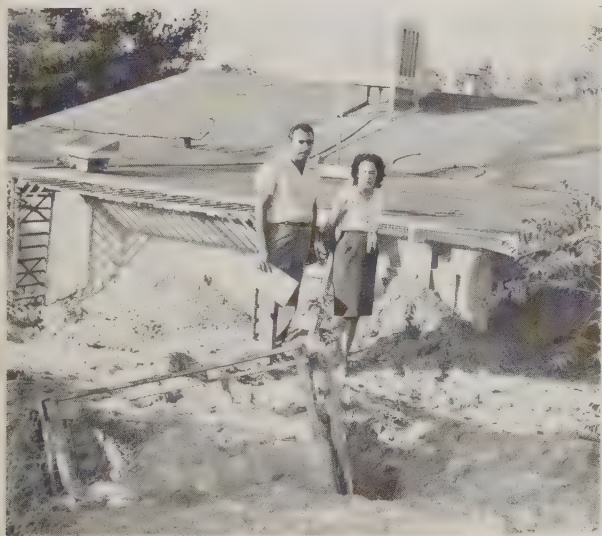
the city since 1958. Plans completed in these areas have been accepted by the city and construction is expected to begin in 1970.

The Bureau of Reclamation and the El Paso Water Improvement District No. 1 cooperated by allowing their subsurface drainage ditches to be used for storm water. The city saved millions of dollars for rights-of-way and construction because of this cooperation.

Most of the flood-plain land is lower than the channel of the Rio Grande, so there is no direct discharge of floodwater into the river. Storm waters must be pumped into the river or allowed to run downstream in open drainage ditches for miles to a river channel outlet.

High peak flows of water from the urbanized area strain the capacity of the manmade river channel which was built according to a treaty

Many homes were ruined or damaged by sediment deposited by July 1968 floodwaters from new residential developments on the higher ground around El Paso (courtesy El Paso Herald-Post). At right is one of the 39 floodwater and sediment retention dams built by the city of El Paso.



with Mexico. This demands that floodwaters from urban El Paso be held temporarily by detention dams to trap silt and control the rate of flow into the Rio Grande channel.

The existing detention dam system has a positive discharge into the river by pumping. A new 800-cubic-foot-per-second lift station was completed in 1968 at a cost of \$1.1 million, and a 300 c.f.s. station is being designed. Many smaller lift stations are scattered along the river for individual subdivisions and other developments.

More recently, the city, along with El Paso County and the El Paso

Hudspeth Soil and Water Conservation District, applied to the Soil Conservation Service for a small watershed project under Public Law 566. This project would be located on the fringe of the urbanized area, both up-river and down-river from the city. With watershed-protection assistance, the city hopes to be able to plan flood and sediment control in the outlying areas before they are developed.

Sediment in a desert metropolitan area is a problem of great magnitude. Providing control prior to development is the only way to economically prevent sediment damage. ♦

RC&D flood-prevention job passes test of storm

A cloudburst that dumped 4 inches of rain in 4 hours on Livingston, Tenn., left the town's industry and business unscathed, thanks to protective measures its citizens had taken against just such an eventuality.

More than 1,400 employees reported for work as usual at the Livingston Shirt Corporation on June 23 after the downpour with its thunder and lightning had rolled on in the early morning hours.

A similar downpour, 4.8 inches in 24 hours, in February 1962 caused damages in excess of \$400,000 and threatened the permanent loss of the shirt factory with its \$30,000-a-day payroll, the area's economic mainstay. But not this time! To the satisfaction and relief of the people of Livingston, the floodwaters flowed quietly past the factory in a prepared channel, into an underground conduit, and into Town Creek nearly a half mile away.

The Hull-York Lakeland RC&D Project, authorized for operation in 1966, helped the local people plan and install a unique flood-prevention project measure designed to prevent a recurrence of the 1962 disaster (See *Soil Conservation*, December 1968).

Key elements of the installation are 700 feet of open ditch and 1,100 feet of underground conduit. Part of the conduit, 54 inches in diameter, is buried 28 feet beneath the streets of Livingston. Completed in the summer of 1967, with the assistance of the Soil Conservation Service, the project measure cost approximately \$212,000, of which the local sponsors paid \$31,000. It functioned flawlessly in the recent storm.

Overton County Judge Elmo Swallows commented, "If the flood problem had not been corrected, I feel sure the shirt factory would be closed. How long? Who knows? Perhaps a week or longer, and thousands of dollars would have been lost in wages, damage to buildings, equipment, materials, and streets."

Livingston Mayor Raleigh Needham stated, "The benefits derived from the flood-control works during this one downpour could very easily be as much or even more than its total cost."

On the day following the storm Carson White, operator of a cafeteria in the affected area, said, "If the ditch and conduit had not been there, we wouldn't be open for business. Instead, we'd be shoveling mud." ♦

Sediment control conference to produce handbook

Review of a proposed new sedimentation control handbook for public officials is high in the order of business for the National Conference of Sediment Control in Washington, D.C., September 14-16.

The guide, financed by a grant from the Federal Water Pollution Control Administration, is to be the basis for a round of institutes to be conducted in 1970 by the National Association of Counties.

The draft of the guide was completed by the National Association of Counties Research Foundation collaborating with federal, state, and local agencies. The Soil Conservation Service was among the agencies providing information for the book.

The conference, the first of its kind, is sponsored jointly by the county association, the National Association of Soil and Water Conservation Districts, and the Soil Conservation Society of America. County, state, and regional officials, representatives of soil conservation districts, and state government representatives will attend.

Cooperating are the Departments of Agriculture, Interior, and Housing and Urban Development.

Attendance is by invitation. About 200 working participants and an equal number of observers are expected.

Conferees will hear authorities discuss the scope of the sediment problem in developing areas; techniques for dealing with soil erosion in critical areas; water-quality standards and case histories in sediment control.

A feature will be a 4-hour bus tour to see results of the Montgomery County, Md., sediment-control program. ♦



Conservation in a new town

**By John N. Holeman and
Elmer F. Sauer**

*Geologist and district conservationist, SCS,
Hyattsville and Ellicott City, Md.*

Built-in conservation measures are taking their place with other advanced ideas of urban planning and land use in the rapidly developing "new town" of Columbia, Md.

Contour plowing may not be on the agenda, but by the time this totally planned community is completed in 1981, many other restyled farm practices will have been adapted and applied on thousands of homesites, streets, and open spaces.

Columbia is a developer's dream city about midway between Washington, D.C., and Baltimore, Md. Enticed by a design for an integrated community of 110,000 people, home-buyers, apartment-seekers, and industries are coming to this new urban center in the countryside rather than settling on the advancing fringes of the two larger cities.

Population has risen to almost 4,000 since the first home was sold in 1967. An attractive combination of tall office buildings, enclosed shopping malls, residential villages, and open space offers a unique mixture of metropolitan advantages and small-town comforts.

Building in conservation

Accepted practices of conservation farming that had been commonplace in agricultural Howard County

before the new town was planned by a nationally famous land-developing organization are being called into play again.

Soil loss and sedimentation traditionally have been regarded as unfortunate but unavoidable side effects of urbanization. Builders in Columbia, however, are striving to minimize the usual damages. With counsel from the Howard Soil Conservation District and technical aid from the Soil Conservation Service, they are testing and using structures and methods to control runoff and erosion during construction and prevent permanent damage.

Columbia's creator, James W. Rouse, head of the Rouse Company, signed a cooperative agreement with the district in 1966. The Soil Conservation Service has worked with engineers in the Columbia Management and Maintenance Division since the first request for technical assistance came 3 years ago. Conservation and construction skills first joined forces to build a wildlife pond and stayed together for sediment control of ever-widening scope in the development.

Original plans for the 16,000-acre tract did not provide for soil protection and sediment control during construction. As mutual understandings with developer, builders, and



The Town Center beside Lake Kittamaqundi (lower left of aerial photo) and the village of Wilde Lake (upper right) are focal points of development in Columbia, Md. Residents can launch sailboats and canoes from the dock on the south shore of Wilde Lake.



Trees (left) preserve the natural look and protect soil and neighbors' yards. Jute netting (above) stabilizes a steep slope.

bulldozer operators have improved, however, several SCS remedies for critical areas have gradually been incorporated into standard seeding and grading procedures. Emphasis is changing gradually from "cure and cleanup" to prevention and careful site preparation.

Protecting the cityscape

Trees, natural topography, and ground cover are retained wherever feasible for the beauty and protection of each subdivision. Columbia's deep, well-drained soils have few limitations for either residential and industrial buildings or sanitation systems. But the soil erodes readily when ground cover on slopes is disturbed.

Problems used to start when grading stopped. Now a simple addition to standard procedure keeps much of the soil in place and out of Columbia's lakes, streams, and streets.

After earth is reshaped for the installation of curved roads, 10-foot strips on each side are smoothed and seeded by a private contractor. The predominantly acid soils are limed and fertilized to suit soil test recommendations. Both hydroseeding and conventional methods have been used to put in annual ryegrass and a mixture of Kentucky 31 fescue and bluegrass.

Asphalt mulch (chopped straw sprayed with a tacking solution of asphalt emulsion) has proved effective and economical on areas where cover is being established.

Other manmade mulches are being evaluated on a roadside test strip. Asphalt and fiberglass alone and in combination with each other are being compared with excelsior netting and cellulose mat.

Stabilization techniques

Builders are urged to stabilize lots with at least partial seeding or sodding before turning them over to new owners. Residents may then arrange for final landscaping without unwittingly contributing additional sediment to the city's man-made lakes.

Erosion has been a problem on some of the original lots as well as in areas currently under construction. Diversion berms and other structures which slow and spread water were installed to restore stability. Jute is being used in swales and drainageways which conduct high velocity waterflows away from buildings and construction sites. Where proper measures have been taken, sediment production has been reduced 80 percent.

Columbia's subsurface utilities have also been a source of concern and sediment. Installation of under-

ground lines for water, sewer, gas, electricity, and telephones has been difficult to coordinate. It is hoped that, with more experience and cooperation, utility companies can reduce sediment output from repeated excavations and numerous open, unprotected trenches.

Tailormade trap

Ditchbank erosion seems minor when compared with the sediment-production potential of a shopping center site or one of the other vast expanses of bare land visible in youthful Columbia. To make sure that Columbians don't sacrifice future water quality and lake capacity for the convenience of a town center, sediment basins have been installed below some large sites.

In major construction areas, all vegetation must be removed. Bare soil is exposed to the elements for months. Since mulches and seed cannot be applied until final grading is completed, indirect control seemed to be the only practical way to deal with such critical sources of sediment.

A debris basin designed by the Soil Conservation Service and installed at the expense of the Rouse Company helps protect Lake Kitamaquundi from shopping center runoff. In a year, it has been necessary to clean out the settling basin



A concrete-lined drainageway (above). While grading is still underway (right), fescue protects soil.



three times. But the expense, effort, and frequency of dredging the lake have been reduced.

Because of the first basin's success 12 others have been put below other disturbed sites to trap sediment before it reaches streams. Periodic cleanout—particularly after intense storms—is an important part of the overall control program.

"We can't afford to keep stabilizing large graded areas while we're still working on the site," says Paul V. Robbins, manager of land-development construction for Rouse. "It is more practical and less expensive to trap sediment than to put on mulches and seed before the major earthmoving work is through."



Silt laden runoff collects in this debris basin below a large site being graded for a shopping mall. As water rises in and around the metal box (above) sediment drops out, dries up, and accumulates for future use. Gabions (below) line the banks of a creek below Wilde Lake Dam. The tightly packed rocks and wire netting might be mistaken for real walls from a distance.

Manmade lakes at work

Columbia's lakes were originally designed and located to help control sediment; yet their future depth and beauty are at stake, too. Sediment dredged out of these aquatic traps has been stockpiled, mixed with dry soil, and later used to fill low-lying areas throughout the development.

Beating bank erosion

Onsite erosion controls solve one type of problem while they may create another. Water concentrated by careful grading, temporary diversions, and other surface channels runs into streams and increases their

erosive power. While carefully planted grass protects roadbanks, a nearby unprotected streambank may be gradually eaten away. Natural undergrowth has been left to protect many of Columbia's existing waterways.

Constructing small grade-stabilization structures, installing gabions and riprap on streambanks, and sloping and vegetating banks with mulch and seed are among measures being taken to control this type of erosion. Jute, fiberglass netting, paper weaves, organic sprays, and other soil stabilization aids are also being tried.





Excelsior netting (top) and fiberglass over asphalt emulsion (foreground) are two manmade mulches compared on a roadside test strip.

The cost of erosion and sediment-control measures has been estimated at one-third of 1 percent of each lot's value. At that rate, soil conservation may cost Columbia around \$2.5 million over the next 10 years. Although a cost-benefit analysis for this program has not yet been made, it is apparent that it will cost far less to control erosion and sediment now than to dredge lakes and clean up open space and backyards in the future.

A universal antidote for sediment-producing areas is an impossible dream; but conservation consciousness is developing with Columbia. This "new town" with a new look owes some of its continuing beauty, stability, and livability to changes in attitude among its developers and builders.

It takes teamwork

Onsite controls require cooperation all the way down the line. The man on the bulldozer is just as important in some ways as the man at the top. Both of them must understand what needs to be done and the importance of doing it. They can't be forced to try new techniques; but encouragement, examples, and

technical assistance are offered whenever possible.

For a development of Columbia's dimension and diversity, the chain of command is complex. The Rouse Company, on behalf of the local Columbia management, cleared all original building and sanitation plans as a unit with the county. Builders then assumed control of construction operations in each of three (eventually seven) complete villages within the city of Columbia.

Responsibility for sediment and erosion control, therefore, shifts from developer to builder to foreman and eventually to the homeowner. Awareness, understanding, and willingness to expend money and effort must go with that responsibility, or much unnecessary sediment may be washed into streams and lakes.

Sediment-control ordinance

Since July 1, a state law for sediment control in the Patuxent River watershed (which includes all of Columbia) has given the Howard Soil Conservation District legal leverage for its own sediment-control program. Urbanization problems and patterns stimulated the drive for legislation and enforcement long before Columbia's advent; but plans

for the huge development hastened acceptance of proposed pre-grading controls in Howard County.

The law requires soil conservation district approval of all plans for earthmoving within the Patuxent River watershed except for dwellings, outbuildings, or agricultural structures on lots of 2 acres or more. State, county, and municipal governments as well as private persons and firms must comply or be subject to fine or imprisonment.

District has manager

The Howard Soil Conservation District has its own manager who assists with inspection and public relations programs for the legislation within the district. The county government is now considering extending similar controls to the remaining 15 percent of the county outside the Patuxent watershed.

Efforts to control sediment pollution in Columbia are now part of the developer's comprehensive program to make sure that residents will enjoy as good a quality of life here in 1980 as they do in 1969.

Protection of natural and man-made resources during construction has long-range benefits which make today's work worthwhile. ♦

Jute netting and straw cover a newly seeded slope. Retouching became necessary when bare spots appeared in this recently established lawn.



Hi, Ellen. How're the windbreaks?" "Hi, Ellen. How's the rock collection?"

"Those are the typical greetings I get these days," explained Ellen Minnet of Spencer, Iowa.

And if you aren't careful, she will proceed to tell you just exactly how the windbreaks in Clay County are doing and why *you* need one.

And if you have any time left over, you might find yourself journeying to one of the schools to view the exhibit of rocks and minerals she has collected from 48 states.

Soil exhibit, too

Then, of course, you might like to drop in to see Ellen, who is employed as a clerk by the Clay County Soil and Water Conservation District and assigned to the Soil Conservation Service office. She will no doubt show you her soil profile exhibit. By the time you leave you will have a new understanding of the importance of soil and water conservation. This would, of course, include how to plant and care for many kinds of trees.

At the mention of trees, Ellen's face lights up and a certain twinkle comes to her eyes. This is one of her favorite projects—and a dream come true.

"When I first came here from Minnesota, I was amazed at the

A conservation profile . . .

Iowa tree woman sells conservation along with 'operation windbreak'

lack of trees," she explained. "It just killed me to see all those poor animals standing out in the fields with no shelter during the winter."

But the lack of trees was just one problem facing the district 8 years ago when Ellen started to work for the district. They also lacked money! There was only \$3.15 in the district's revolving fund. The district uses this fund to sponsor tours, exhibits, awards, scholarships for teachers and students to summer conservation workshops and camps, and to cover other expenses.

Ellen put the two problems together and came up with a prize-winning solution—she would sell trees for the district.

District fund in black

And sell trees she has—more than 191,000 in the past 6 years. The district fund is now about \$7,000.

"And that is with just 1 to 2 percent profit each year," Ellen explained.

But the going hasn't always been easy.

"The first 2 years were really the

hardest," she explained. "You know there is nothing more doubting than a farmer. You have to give him proof. So you have to show and tell and tell and show."

Her first show, "Operation Windbreak," was a resounding success at the Clay County Fair.

"I didn't know anything about trees when I started. I traveled to five states and talked to everybody—nurseries, other districts, the Forest Service, wildlife conservationists, anyone I could find to tell me about trees," she said.

"While in Colorado and Wyoming, I told the Forest Service people about my idea. They promised to do what they could to help.

"One day just before the fair a big truck pulled up in front of the office and unloaded what looked like a huge coffin," she said. "Inside were 28 evergreens—all different sizes and species."

Ellen set to work on her exhibit. She planted each tree in a 5 gallon bucket and hauled in plastic, shavings, water, and trees. "Operation Windbreak" was soon ready for the public. She then talked trees for 8 straight days.

Showing and telling

She is still "showing and telling," at the fair and in the office. Each spring she crowds pictures and live potted trees into the SCS office.

In addition she plants a sample of each kind in her own yard as a showcase.



Children stop to hear Ellen Minnet's stories of rocks and minerals.

Besides selling trees, Ellen does all the ordering and runs the pickup and delivery service. She sends her order to a nursery in Fremont, Nebr., during May or June so she will be sure to get the quality and size she wants. The following April she borrows a truck and drives to Fremont to pick up her order.

Back home she delivers the orders to her buyers—farmers, churches, schools, parks, city people.

As a public service project, the district donates trees to a different park each year. In addition, last year Ellen distributed trees to every child in the seventh and eighth grades and gave them instructions on how to plant and care for them.

"When I first started, I wondered if I would ever see the fruits of this endeavor," she recalled. And with that certain sparkle that comes from a job well done, she added, "Now you can drive anywhere in the county and see beautiful windbreaks."

But selling trees is only a small portion of the work Ellen Minnet is doing for conservation and the

people of Clay County, Iowa. She is a whole book of projects, ideas, and goals.

"The only way to get something done is to set a goal," she explained. Her rock and mineral collection is one goal that has taken many years to complete. The collection is on exhibit in the museum during the summer, but during the school year it is transported by buses from school to school all over the county. It has been displayed at the county fair for the past 3 years.

Ellen accompanies the popular exhibit to each new school where she enthralls both students and teachers with her stories about rocks and minerals—where they come from and how she got them.

She has collected most of them herself on her camping trips to every state in the Nation except Hawaii and Alaska, which she hopes to visit in the near future.

At the office, it's not unusual to find her surrounded by rocks and the various exhibits she has completed. Many are used to explain a complete farm conservation plan or

the difference between kinds of soils to both farmers and urban people. Her soil profiles were on display at the fair this year.

She is also a speaker at night classes for the women of the Farm Bureau. She often takes her farm plan and soil profile exhibits to these classes where she explains what a soil map is, how to read it, and how to determine what conservation practices are needed.

"I often have these women coming in the next day asking just what I meant by this or that," she said.

Besides enjoying the classes, she has an ulterior motive. "You get to the husbands through their wives and children," she explained with a smile.

Ellen is presently working on an information project to educate the whole county on soil and water conservation. The project is already well underway.

And with Ellen Minnet behind it, Clay County, Iowa, undoubtedly will be a strong contender for the title as the Nation's best informed county on soil and water conservation. ♦

Ranch for training Scouts in conservation

The rugged beauty of the Cimarron country in northern New Mexico offers a choice setting for teaching outdoor activities and for putting conservation practices into actual use.

And the sprawling Philmont Scout Ranch with a wide variety of wildlife and recreational facilities, 5 miles south of Cimarron, is the place to train Scouts from all rural and suburban areas and some foreign countries in such things as building a small rock dam, taking a basic soil sample, or improving a mountain forest trail, as shown in the photograph.

These conservation projects were taught last summer by Scout leaders trained by a team of Soil Conservation Service conservationists, who conducted classes for the leaders early in the season. ♦





County Agent Perley Colby explains a soil profile to campers.

City young people explore ecology at Spruce Pond Conservation Camp

By David N. Allan

Biologist, SCS, Durham, N.H.

The camp is deep in the woods. Tall, old pines cast cool shadows on granite ledges. Between their towering trunks one can see a lake sparkling in the warm, summer sun.

This is the setting for an unusual camping experience. Each June, for the past 22 summers, young people from New Hampshire and neighboring states have come to Spruce Pond Conservation Camp to have fun and spend a week learning about the world of conservation.

The Society for the Protection of New Hampshire Forests sponsors the privately owned and operated camp. It is unique in that training stresses ecology instead of hunting, fishing, archery, or game management. This helps each camper understand his relationship with his environment.

Instructors from the various resource agencies live with the campers and give them a better chance to understand the conservation professions. We have the opportunity to be with young people at

work and play and to share the awareness, vitality, and hopes of youth.

The camp is directed by Leslie Clark, an educational consultant for the society with many years of work in this field. He makes the job of supervising the camp look easy, but it isn't.

Campers are divided into three groups of boys and one of girls. Groups are rotated so that each receives the same information. On the last day of the week they take a tour to see how landowners apply principles they have learned.

The same instructors have served as a team for several years. Wilbur Thompson, Merrimack County forester, takes youngsters on field trips into the woods and teaches them good forest management. They see tree plantations, woodland cutting practices, tree pruning and other practices. They learn to identify native trees and shrubs. But their most important lesson concerns the interrelationships of trees, soil, water, and animals.

Roger Leighton, Strafford County forester, and I teach about animal life and stress the relationships between animals and their environment. Youngsters see beavers at work damming streams and felling trees. They examine porcupine dens and discuss the effects these animals have on trees. Birdbanding and the use of mist nets are shown. The use of such knowledge in wildlife management is discussed.

Perley Colby, Hillsborough County agricultural agent, teaches about soils. He digs test pits to show soil profiles and explains the relationship of plants to different soil types with the help of soil maps of the Soil Conservation Service.

I teach water conservation. We talk about various uses and misuses of water, such as the pollution of New Hampshire's lakes and streams. The effects of water on plants, animals, and soils are pointed out during field trips, and we observe the many examples of succession of ponds to bogs in this glaciated area. We seine Spruce Pond for fish and collect samples with a plankton net so that we can observe the food chain in the lake. We also study the effects of sunlight on aquatic plants and animals.

The week's lessons come to a pleasant but practical conclusion on Friday, when half of the campers spend the morning on a forestry and wildlife field trip and the rest visit the Russell Yeaton farm in nearby Epsom.

The youngsters walk over the farm while Mr. Yeaton explains his conservation practices and why he applied them. They go into a managed woodlot that was once a pasture before a former owner went off to fight in the Civil War. They see these trees used as lumber in the new barn and in a son's new home. They see water conserved in

a farm pond and an irrigation system supplying it to the land. There are tile lines and ditches to remove excess water and improve drainage. They may see a black duck taking off from a drainage ditch or note where a deer has browsed on the sprout growth in a forest opening. Wildlife and the farm are tied together.

Many of these young people have never been on a farm. They can still see the old ways in Yeaton's old barn with its hand-hewn beams, wooden tunnels, and hay mows. His new barn has gutter cleaners; baled hay goes up to the loft by conveyor belt. The spotless milkroom fitted with shiny stainless steel bulk tanks full of milk shows them the work and money that go into providing a quality product. Before this field trip, few are aware of the cost of equipment and the hard work that put food on their tables.

But let's get back to the regular camp day. Plenty of time is left for swimming, fishing, or boating on the lake. A fast game of softball is usually in progress, but some take advantage of the time for relaxing. After supper discussion groups hear about conservation and present their views.

On a special evening, the instructors speak about their hobbies. Perley displays his collection of Indian artifacts. Wilbur, a knife collector, demonstrates the care of knives. Roger is a dowser and a weather forecaster. I demonstrate my use of art in illustrating wildlife and plant life.

Skits or sing-ins around the evening campfire at the beach end in a moment of quietness. The night wind sighs through the pines, a bird calls, and the stars seem closer. We sing "Taps" and the day ends.

This has been a memorable experience for more than 2,000 young people during the past 22 years. Several have chosen some branch of conservation as a life's work. Nearly all come away with a greater appreciation of their relationship to the world around them. ♦

Conservation in action

Wind-erosion control practices bring relief to motorists, farmers

The highway patrolmen may not understand completely, but they undoubtedly are grateful for the improvement of conditions along certain stretches of roadway in Potter County, S. Dak.

There was the spring of 1967. The winter had been dry. The wind on Sunday, May 7, reached its peak, gusting up to 65 miles an hour.

That meant trouble on the highway, with the thick dust billowing from upwind fields. Motorists switched on headlights, but the beams could scarcely penetrate the walls of dust. Visibility was 6 feet or less much of the time. The harried patrolmen detoured traffic around the trouble stretches.

It was a relief for drivers to come to fields of Great Plains Conservation Program participants that were protected by stubble mulching, crop residue management, one-row tree belts, and wind stripcropping. Roads along these fields had nearly unlimited visibility. Farmers with these protective measures found their small grain crops relatively undamaged and replanting unnecessary.

Now, 2 years later, Potter County farmers and ranches have even more

control over wind erosion. There is a feeling of satisfaction, they say, in knowing you have done all you can to protect your land.—VINCENT E. ZUTZ, *district conservationist, SCS, Gettysburg, S. Dak.*

New York

Crownvetch curbs erosion around city water tank

Crownvetch, multiflora rose, and red pine have stabilized and beautified the area around the James M. Caird Reservoir built in 1964 to meet the increasing domestic and industrial water needs of Elmira, N.Y.

Before conservation planting began in May 1966, silt and debris from an eroding bank above the 2-million-gallon steel tank caused recurrent maintenance problems. Excavation had stripped away all protective cover and exposed partially weathered rock and shale.

SCS soil conservationists serving the Chemung County Soil and Water Conservation District studied the site at the request of John G. Copley, general manager of the Elmira Water Board. They prescribed Chemung crownvetch—a variety

Approach to Elmira's water tank seeded to crownvetch and mulched.





Above, at 2 p.m. on the highway by unprotected field in Potter County. At left, wind-erosion control practices.



James D. Snow (left), P. E. Battle of the Calhoun County ASCS, and pond.



noted for its exceptional vigor developed at the SCS plant materials center at Big Flats, N.Y.

A diversion installed above the barren slopes kept runoff from washing away the mixture of crown-vetch, red fescue, and perennial rye grass supplied by the district. Straw mulch and commercial netting provided by the Water Board held down the hand-broadcast seed.

An August drought killed many vetch and grass seedlings that had established by mid-June. Remaining vegetation gave some protection, but more crownvetch was overseeded in May 1967 to speed up the spread of permanent cover. By midsummer 1968, an excellent stand covered the bank with pinkish purple flowers.

In addition, the Water Board planted red pine trees on the bank of an access road. The diversion ditch and an abandoned road were seeded

to red fescue and birdsfoot trefoil.

While wildlife habitat improvement was not the primary aim of the project, deer, rabbits, and song birds will benefit from food and cover supplied by the new plants.—JESSE L. MCWILLIAMS, *plant materials specialist, SCS, Big Flats, N.Y.*, and CHARLES J. CHARWAT, *district conservationist, SCS, Horseheads, N.Y.*

Alabama

Farmer creates recreation for his community

James D. Snow, a farmer of Hobson City, Ala., provided additional recreational facilities for his predominately Negro community and found a new source of income when he developed a fishing and recreation enterprise on his farm.

Snow, a cooperator of the Calhoun County Soil and Water Conservation District, is managing his 68 acres according to a conservation plan developed with assistance of the Soil Conservation Service. This conservation plan was used as the basis for approval of an Appalachian Land Stabilization and Conservation Program (ALSCP) contract with the Calhoun County Agricultural Stabilization and Conservation Committee. He will receive about \$2,500 ALSCP cost share on the benefited 50 acres.

This ALSCP financial aid and SCS technical assistance resulted in the completion of a 2-acre fishing lake enterprise. Included are a 1-acre parking area and 9 acres of land that he cleared, seeded, and developed for picnic and recreational uses.

Snow has stocked the newly constructed pond with bass and bream and plans to open it to the public for fee fishing in late summer or early fall of 1970.

In the future, Snow plans to install access roads, sanitary facilities, picnic tables, provide boats, a water supply, and other facilities for the comfort and enjoyment of his customers.—H. C. DeBARDELEBEN, JR., *district conservationist, SCS, Anniston, Ala.*

Increased income taxes repay conservation cost

Conversion of an 815-acre salt-waterlogged farm from a tax write-off to a money maker for the Hankins family and for the U.S. Government is what Dee Hankins accomplished in 4 years with aid of the Great Plains Conservation Program.

In 8 years he will repay through increased income taxes the Government's cost-share assistance on the farm he bought in the Wichita Soil and Water Conservation District in Texas in 1962. It had changed hands six times in the preceding 4 years.

Hankins started his Great Plains Program in June 1963 and completed it in December 1967. A detailed cost-return analysis before and after treatment showed he increased his net return from \$1.82 to \$20.94 an acre.

Under his Great Plains contract, Hankins leveled 350 acres of land with his own equipment, sodded 200 acres of Coastal bermudagrass, lined 10,000 feet of concrete irrigation ditches, seeded 200 acres of range-land, and built five farm ponds.—E. WAYNE CHAPMAN, *area conservationist, SCS, Vernon, Tex.*

Use of electricity by rural consumers

Almost 62 billion kilowatt-hours of electric energy were required by Rural Electrification Administration borrowers during fiscal year 1968 to meet the needs of rural consumers.

This k.w.h. input is the highest for any year on record. It is a gain of 5.5 billion over the previous fiscal year, and is 38.6 billion greater than the input required by rural electric systems in 1958.

More than 5.9 million rural consumers in 46 states were then on the lines of REA-financed electric systems. New consumers continue to be added at the rate of 150,000 a year. ♦

Meetings...

Public land is theme of forestry group

"Destiny of the Public Lands" is the theme of the 94th annual meeting of the American Forestry Association at Colorado Springs, Colo., Sept. 21-24.

Chairman of the Public Land Law Review Commission, Congressman Wayne Aspinall, is one of the principal speakers on the public land topic.

State foresters hold meeting in Maine

The 47th annual meeting of the National Association of State Foresters will take place in Portland, Maine, September 28 through October 2.

Speakers appearing during the two general sessions include: William D. Hagenstein, president, Society of American Foresters; Ernest J. Hodges, president, American Forest Institute; Edward P. Cliff, chief, U.S. Forest Service; Kenneth E. Grant, administrator, Soil Conservation Service; and Gordon K. Zimmerman, executive secretary, National Association of Conservation Districts.

Dates and places

September 8-10, International Association of Game, Fish, and Conservation Commissioners, New Orleans, La.

10-12, American Fisheries Society, New Orleans, La.

14-16, National Conference on Sediment Control, Washington, D.C.

14-19, American Planning and Civic Association, Chicago, Ill.

14-19, National Recreation and Park Associate, Chicago, Ill.

21-24, Farm and Industrial Equipment Institute, San Francisco, Calif.

21-24, American Forestry Association, Colorado Springs, Colo.

21-25, National Association of County Agricultural Agents, Atlantic City, N.J.

28-Oct. 1, American Bankers Association, Honolulu, Hawaii

29-Oct. 2, National Association of State Foresters, Portland, Maine

October

October 1-4, National Conference of Editorial Writers, Indianapolis, Ind.

5-10, Water Pollution Control Federation, Dallas, Tex.

8-11, National Association of Biology Teachers, Philadelphia, Pa.

12-17, Society of American Foresters, Miami, Fla.

13-17, American Society of Civil Engineers, Chicago, Ill.

19-22, American Chamber of Commerce Executives, Detroit, Mich.

19-24, National Reclamation Association, Spokane, Wash.

21-25, Association of Engineering Geologists, San Francisco, Calif.

26-29, American Association of State Highway Officials, Philadelphia, Pa.

27-31, American Water Resources Association, San Antonio, Tex.

Rural people benefit from recreation facilities

Nearly three-quarters of a million rural people are benefiting from 629 large-scale rural community recreation facilities financed by the Farmers Home Administration since the program started 5 years ago.

Nonprofit rural groups received \$83.3 million for swimming pools, picnic parks, athletic fields, and small golf courses and lakes. Some 780 individual farm operators received \$5.5 million for recreation enterprises on their farms. And during fiscal 1968, 226 rural communities received nearly \$24 million for recreation centers.

Funds for recreation loans are provided by private investors on an insured basis. ♦

New RC&D Project

Ten northeastern Wisconsin counties—Florence, Forest, Langlade, Lincoln, Marinette, Menominee, Oconto, Oneida, Shawano, and Vilas—have organized the Lumberjack Resource Conservation and Development Project to improve their economy and living standards with USDA technical help and financial assistance. The project has been approved for federal assistance.

The area's 5,704,500 acres of beautiful forests, lakes, and streams hold a vast potential for development of recreation features, the project plan points out. Some 1,786 lakes and 3,000 miles of trout-fishing streams are expected to pay dividends through tourism and recreational uses. ♦

Review



Mineralogy in Soil Science and Engineering. EDITED BY MATTHAIS STELLY. 1968. *Soil Sci. Soc. Amer. Spec. Publ. 3.* Madison, Wis. 106 pp., illus. \$3.

Those who already know a good deal about soil mineralogy and are looking for an up-to-date survey on the subject, particularly as related to research, will find it in these five papers given in a symposium at the 1967 meeting of the Soil Science Society of America.

P. H. Low draws upon 92 references to show convincingly that "pure systems of different clay minerals have different physical properties." He discusses these properties and argues for appropriate recognition of mineralogy in physical systems.

In his broad-scope paper about applications of soil mineralogy to chemistry and fertility investigations, C. I. Rich uses 102 references to set forth and explain relationships of mineralogy to soil chemistry, including ion exchange phenomena; the significance of crystalline structure to soil chemistry; and soil fertility as related to soil mineralogy.

R. J. McCracken approvingly explains the use made of soil mineralogy in the current pedological soil classification. He also identifies 10 problems that need to be solved in order to make full use of mineralogy in soil classification.

In his paper on engineering applications, Hans F. Winterkorn points out that mineralogy is important indeed, not only as clay-size particles but in the full range from small boulders to colloids. He attempts to present a "synoptic picture of engineering applications of soil mineralogy." This attempt, he acknowledges, is necessarily fragmentary, but it is illustrative of the importance of mineralogy to engineering.

W. F. Bradley, in his discussion of trends in mineralogical analyses,

reviews the structural features of silicate minerals pertinent to their behavior in soils and points out recent instrumental methods that are making possible a better understanding of soil mineral reactions.—A. C. ORVEDAL, *soil scientist, SCS, Washington, D.C.*

Deserts of the World: An Appraisal of Research into their Physical and Biological Environments.

EDITED BY WILLIAM G. MCGINNIES, BRAM J. GOLDMAN, AND PATRICIA PAYLORE. 1968. *University of Arizona Press, Tucson*, 788 pp. \$15.

This handsome outsize book is a major compendium of information on the world's deserts, resulting from a contract between the University of Arizona and the U.S. Army Research office. It is an appraisal of past and present research based largely upon critical review of published literature, as supplemented by consultation with specialists.

The treatment embraces desert geography (including maps), weather and climate, geomorphology, surface hydrology and materials, vegetation, fauna, and coastal zones. Extensive bibliographies are supplied for those interested in the ecology of the arid areas of the world. Indexes of subjects, authors cited, and scientific names of plants are included. A base reference of great value.—W. R. VAN DERSAL, *deputy administrator, SCS.*

New publications

The Measure of Our Land. (BY SOIL CONSERVATION SERVICE). Rev. 1969. *USDA PA-128*. 22 pp., illus. This bulletin presents the land-capability classification system the Soil Conservation Service has used for nearly 30 years as a practical means of helping farmers and ranchers make conservation plans for their land. It updates the popular bulletin of the same name published in 1951 and is based on the technical statement of the system in *USDA Agriculture Handbook 210, Land-Capability Classification*, by A. A. Klingebiel and P. H. Montgomery.

The land-capability classification reflects the physical limitations of soils for agricultural use. There are eight classes, each including many kinds of soil. The

higher the number of the class, the greater the limitations on the use of the soils for cultivation. Thus, adaptability and freedom of choice of uses are good in the lower-numbered Classes I, II, and III, but decrease progressively in Classes IV, V, VI, VII, and VIII.

Urban Planning in Rural America. BY WILLIAM M. CARROLL AND ROBERT G. WINGARD. 1968. *U. S. Dept. of Housing and Urban Development*. 53 pp. \$0.40. Report of a study, aided by a federal urban planning assistance grant, conducted in 1964-65 for the Pennsylvania State University, Pennsylvania Department of Commerce and the Department of Housing and Urban Development. The inquiry was carried out by means of confidential interviews with professional planners, educators, officials, and citizens in six mid-Atlantic states.

The authors conclude, among other things, that "Rural residents appear to support the comprehensive planning process, but present plans do not reflect their concern for the natural environment . . . A principal limiting factor in the effectiveness of planning for urban development in rural areas is the lack of natural resource elements in comprehensive plans."

Ozark Range and Wildlife Plants. HEWLETTE S. CRAWFORD, CLAIR L. KUCERA, AND JOHN H. EHRENREICH. 1969. *USDA Agr. Hbk. 356*. 236 pp., illus. \$2.50. A fieldbook for identifying plants of the Ozark region and describing their values for wildlife and livestock. Plants arranged alphabetically by genera within three groups: grasses and grasslike plants, forbs and miscellaneous lower plants, and woody plants. The authors are wildlife ecologist (Crawford) and formerly range conservationist (Ehrenreich) of the U.S. Forest Service and professor of botany of the University of Missouri. There are many new drawings of plants and plant parts.

An Econometric Model for Predicting Water-Oriented Outdoor Recreation Demand. BY GLENN A. GILLESPIE AND DURWARD BREWER. 1969. *USDA Economic Research Service ERS-402*. 15 pp. The model, one of the first of its kind, analyzes socioeconomic characteristics associated with water-oriented outdoor recreation activities of people: annual family income, education, sex, race, age, and occupation. The model was applied to a 1,000-family sample of people in the St. Louis, Mo., area.

Community Resource Development; How Cooperative Extension Helps. 1969. *USDA PA-902*. (8 pp.) folder.

Evaluating the Economic Structure of a Rural Area. Demonstration of an Input-Output Analysis. 1969. *USDA Economic Research Service ERS-386*. 27 pp. Describes one method applied to a

10-county area near Asheville, N. C., with a predominantly rural and low-income population.

DDT Used in Farm Production. BY THEODORE EICKERS, ROBERT JENKINS, AND AUSTIN FOX. 1969. *USDA Agr. Econ. Rpt. 158*. 7 pp. History and analysis of the current use of DDT in agriculture. U. S. output of DDT is about 40 percent less than the peak reached in 1962-63. Exports claim an increasing share—about 70 percent of total production in 1966-67.

Pesticide Application Equipment Owned by Farmers. BY ROBERT JENKINS, THEODORE EICKERS, PAUL ANDRILENAS, AND AUSTIN FOX. 1969. *USDA Agr. Econ. Rpt. 161*. 15 pp., illus. Based on a nationwide (48 states) sample survey of farmers conducted in 1965 to measure the extent of pesticide used by farmers during 1964.

Food Aid and Agricultural Development. BY FRANK D. BARLOW, JR., AND SUSAN A. LIBBIN. 1969. *USDA, Foreign Agr. Econ. Rpt. 51*. 85 pp., charts. A summary of food aid to foreign countries from 1955 to 1966, mainly under Public Law 480, and its effect on agricultural development and related problems.

Proceedings of the 1969 National Conference on Water Conservation With Sprinkler Irrigation, Washington, D.C. 1969. *Sprinkler Irrigation Association*. 113 pp., \$3. Contains 19 articles on water conservation and sprinkler irrigation written by specialists in the federal government, universities, and private industry.

15 Years of Better Fishing. 1967. *U.S. Dept. of Interior Bureau of Sport Fisheries and Wildlife*. 32 pp., illus. \$0.50. A report on the progress in sport fish restoration during the 15 years since the passage of the Federal Aid in Restoration Act, popularly known as the Dingell-Johnson, or D-J, Act.

Pasture Productivity of Crested Wheatgrass as Influenced by Nitrogen Fertilization and Alfalfa. BY GEORGE A. ROGLER AND RUSSELL J. LORENZ. 1969. *USDA Tech. Bull. 1402*. 33 pp. \$0.20. Results of a study at the Northern Great Plains Research Center at Mandan, N. Dak.

Farm Labor Inputs, 1964. BY WALTER E. SELLERS, JR., AND THEODORE E. EICKERS. 1969. *USDA Econ. Res. Serv. Statistical Bull. 438*. 45 pp., illus. Survey includes detailed data for most farm types, economic classes of farms, and farm production regions.

The Toxicity of Some Organic Herbicides to Cattle, Sheep, and Chickens. BY J. S. PALMER AND R. D. RADELEFF. 1969. *USDA, Production Research Rpt. 106*. 26 pp. \$0.20.

Productivity of Diverted Cropland. BY P. WEISGERBER. 1969. *USDA Econ. Research Serv. ERS-398*. 23 pp., illus. Estimates of the average productivity per acre of cropland diverted from production under U.S. Government programs.

Airphoto Use in Resource Management. BY ORVILLE E. KRAUSE. 1969. *USDA Agr. Inf. Bull. 336*. 26 pp., illus. A survey of nonfederal purchasers of Agricultural Stabilization and Conservation Service airphotos.

The Poor, A Selected Bibliography. BY PETER R. MAIDA AND JOHN L. MCCOY. 1969. *USDA Misc. Publ. 1145*. 56 pp. An interdisciplinary view of the literature to show the complex nature of the poverty problem.

Suggested Guide for Weed Control 1969. BY CROPS RESEARCH DIVISION, AGRICULTURAL RESEARCH SERVICE. 1969. *USDA Agr. Hk. 332*. 70 pp. Mainly recommendations for use of herbicides.

Public Access to Public Domain Lands. BY JAMES A. MUNGER. 1968. *USDA Publ. 1122*. 64 pp., illus. Two case studies of landowner-sportsman conflict.

Low-Cost Wood Homes for Rural America—Construction Manual.—BY L. O. ANDERSON. 1969. *USDA Agr. Hbk. 364*. 112 pp., illus. \$1

Careers for Women in Conservation. 1969. *U.S. Dept. Labor Leaflet 50*. 8-page illustrated folder.

Soil surveys

Mitchell County, Texas. BY HERBERT R. STONER, TOMMIE J. HOLDER, DONALD L. MCCLENNEN, AND KELLY M. TEMPLETON. 1969. 47 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Washington County, Arkansas. BY M. DEAN HARPER, WILLIAM W. PHILLIPS,

AND GEORGE J. HALEY. 1969. 94 pp., illus.; Maps 3.17 inches to the mile (1:20,000).

Allen County, Indiana. BY F. R. KIRSCHNER AND A. L. ZACHARY. 1969. 76 pp., illus., maps 4 inches to the mile (1:15,840). Fieldwork by A. L. Zachary, J. U. Anderson, D. F. Post, T. E. Barnes, H. P. Ulrich, and A. R. Grunewald.

1969 wind-erosion damage at low point in record

Wind-erosion damage in the Great Plains this year is the lowest ever recorded in 35 years of annual reports.

A total of 995,150 damaged acres was listed in the final 1969 "blow season" report as of May 31, a decrease of more than 15 percent from the previous year.

SCS and the Great Plains Agricultural Council have kept reports of wind-erosion damage since 1934. In the drought years of the 1950's, the acreage damaged by wind in a single season reached as high as 15,789,000 acres.

Texas and North Dakota reported the greatest amount damaged and Kansas the least. Ninety-five percent of the wind-erosion damage was on cropland.

The reduced damage this year is attributed to better moisture conditions, fewer extremely high winds, and greater use of soil and water conservation practices by Great Plains landowners.

The record by states is as follows:

	1969 Acres	1968 Acres
Northern		
Montana	78,540	149,860
Nebraska	48,515	60,650
North Dakota	225,020	445,000
South Dakota	36,800	26,510
Wyoming	22,780	33,300
Subtotal	411,655	715,320
Southern		
Colorado	27,830	73,350
Kansas	7,900	58,000
New Mexico	25,300	13,700
Oklahoma	35,275	7,273
Texas	487,190	311,290
Subtotal	583,495	463,613
Grand Total	995,150	1,178,933



DON'T MAKE OUR COUNTRY A DUMPING GROUND

KAB-3

Sediment control and water quality

The Department of Agriculture's report to the President this year on agriculture-related pollution contained this paragraph:

"From the standpoint of quantity, sediment resulting from erosion of the land is the greatest contributor to pollution of surface waters. The effect of this pollution by sediment is expressed in the impairment of the quality of the water and the damage caused where the sediment comes to rest. The harmful effects are many—some physical, some chemical, and some biological."

Other sources of water pollution have drawn more attention than sediment, particularly the dumping of raw or partially treated sewage into our streams and the spewing forth of industrial poisons into our rivers.

But sediment also is a menace to the quality of water. It clogs our streams, silts in our harbors, fills our lakes and reservoirs with mud. It destroys opportunities for recreation, raises the price of water and electric service, and causes floods.

Much of the sediment which fouls our water comes from agricultural land. This has been a national concern for more than a generation, and we are making encouraging progress in dealing with the problem.

In recent years, however, an increasing load of sediment has been washing from construction sites, from developing areas around cities where farms are turning into housing developments and shopping centers, from highways and airports. Soil erosion can increase dramatically on land being converted to suburban uses—sediment discharges of up to 25,000 tons a square mile annually have been recorded.

The sediment load from these critical areas is in part a result of technological advance, made possible by the development of massive earthmoving machines capable of scraping away acres of soil-binding cover in a few hours. But it is also a result of the indifference or lack of information of builders and public officials. Sediment need *not* be the unavoidable price of land development. Sediment on construction sites can be controlled, in many cases with modifications of the same practices used so successfully on farms.

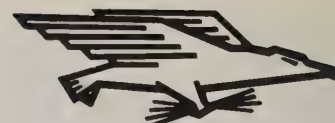
We are heartened, therefore, by the forceful leadership being given this month in the war on sediment by the National Association of Counties, a professional association of elected county officials. Together with the Soil Conservation Society of America and the National Association of Soil and Water Conservation Districts, the county group is sponsoring a National Conference on Sediment Control, set for September 14-16, in Washington, D.C.

Participants in this conference will, among other things, review a draft of NACO's forthcoming guide to community action programs for sediment control, a book which hopefully will form the basis for a round of NACO institutes next year. The guidebook has been prepared by NACO with the help of a grant from the Federal Water Pollution Control Administration.

SCS is proud to have a part, along with several other Federal agencies, in planning and presenting this landmark conference and in contributing information for the guidebook.

Now we are ready to work more closely with county officials across the Nation in developing and applying practices to help put a stop to erosion in developing areas.

Kenneth E. Grant



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Appalachian community has new economic outlook

Many a traveler in search of scenic beauty has followed the winding roads through the Appalachian hills of southeastern Kentucky and found his reward. But, until recently, many a resident of the same areas has failed to find a good living.

Now, the Blakes Fork Area of Whitley County is changing. The people have found a way to improve their community, to build up their economy, and to benefit from their natural resources—not the least of which is natural beauty.

The Whitley County Soil and Water Conservation District provides the local structure for launching new improvements, and the Appalachian Land Stabilization and Conservation Program has added the stimulus. The program, set up by Congress as part of the Appalachian Regional Development Act of 1965, was begun in Blakes Fork in 1966.

The people of Blakes Fork are eager to tell how the program has helped them. In some cases farmers have tripled production. R. L. Brown, who owns 116 acres in the area, said, "The previous owner of this farm had hoped to make it carry 12 cows and calves. My conservation plan in this program calls for 42 beef cattle, and I already have 46 head."

J. H. "Herb" Barnett, with the help of his son and small grandchildren, grows vegetables to supplement his income from beef cattle and tobacco.

"I bought a good Hereford bull and am keeping my best heifers to build my herd of cows up to 30,"



Eroded and unproductive pasture (above) is giving way to good fescue and ladino clover pasture in the Blakes Fork Area.



Herb said. "Bill Dempsey, district conservationist, SCS, helped me plan my farm to carry that many."

Other improvements are transforming the Williamsburg area into a progressive community. The county has built a new high school to replace two small, poorly equipped, high schools. A nine-hole golf course in the area provides entertainment and employment for local residents in conjunction with a pic-

nic area and a fishing lake. And, a water district is being formed to develop a dependable water supply and attract businesses to the area.

With these improvements the people of Blakes Fork are looking to the future with new confidence and a determination to make the Appalachian landscape as productive as it is beautiful.—ROBERT S. REYNOLDS, assistant state conservationist, SCS, Lexington, Ky. ♦

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Soil **Conservation**

Devoted to the wise use of land and water resources

35/3 October 1969

CURRENT SERIAL RECORDS

Windbreaks—

On the plains
In the desert
On muckland farms
Where forests grew before

Also—

Boy Scouts and conservation

Soil Conservation Service
U.S. Department of Agriculture



Our lead articles this month reinforce the thesis that conservation plans and rewards span the generations.

For a historical view of windbreaks in the Plains, the Forest Service provided photographs of tree plantings made in the "Dust Bowl" days. Information Specialist John Cross then helped Forester Art Ferber and state fieldmen check on the condition of those plantings today.

Their summary (p. 51) of what we have learned from the experience emphasizes the benefits today's farmers enjoy from the efforts of their fathers and grandfathers.

Against the wind

The long-term view is evident also, as with all tree plantings, in the accounts of windbreaks protecting the railroad across the Coachella Valley in California (p. 55); a farmer's growing tree barriers against the winds in the mucklands of Wisconsin (p. 62); and the reestablishment of shelter around farmsteads in Ohio (p. 57).

Looking ahead

The next generation's stake in conservation is implicit in the Boy Scouts' "statement of commitment" (p. 59) distilling the thought of some 30,000 boys attending their 7th National Jamboree in Idaho.

Education Specialist Walter Jeske and 19 other SCS staffers lived and worked with the youths and leaders "for the duration." Walt brought back the center-spread account of the affair.

COVER: A wintry view between redcedar rows in a Nebraska windbreak looks out on a field that will be watered by the trapped snow.



Soil Conservation

Devoted to the wise use of land and water resources

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

CLIFFORD M. HARDIN, Secretary of Agriculture
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A generation of grateful landowners . . .

B²X

Windbreak plantings continue as farmers profit from shelterbelt experience

By A. E. Ferber

Regional forester, SCS, Lincoln, Nebr.

Many of today's landowners, especially in the Plains and Prairie states, are reaping the benefits of the foresight and labors of an earlier generation of tree planters.

In the United States there are more than 630,000 acres of farmstead windbreaks and 86,000 miles of field windbreaks. At least two-thirds of them are more than 10 years old, so they have significant effectiveness as shelter for people and livestock and protection of fields from soil erosion.

"The greatest . . ."

Wayne Walmer of Orchard, Nebr., is one of the grateful landowners. He farms land where his father-in-law, Charles Johnston, planted windbreaks in 1938 as part of the Plains Shelterbelt Project.

"Shelterbelts are the greatest thing that ever came to this country," Walmer says. "For my money, no cattle shed can compare to a windbreak for shelter."

Farmers like Walmer and Johnston are continuing to plant trees apace today. Last year, soil conservation district cooperators across the Nation planted approximately 20,000 acres around farmsteads and 3,500 miles of rows or belts in fields.

A long history

Although today's use of tree windbreaks evolved in a direct line of experience from the famous shelterbelt project of the 1930's, windbreak plantings began years before that.

In Nebraska and other Great Plains states they date back to 1854

when settlers dug wild native seedlings and set them around their homes.

Kansas in 1865 enacted a "tree bounty" law under which a landowner could plant an acre or more of trees or a half mile of windbreak and get paid \$2 an acre per year for 25 years.

The Timber Culture Act of 1873 offered free land to Plains settlers who would agree to plant a fourth of every quarter section to trees.

Only a small percentage of those early-day tree claims were successful. Hardiness, or lack of it, of the kinds of trees planted was one of the problems. Little or no thought was given to soil adaptations.

Needs for more scientific information led the South Dakota State College to set up research as early as 1895. Other colleges in the Plains followed, and some of these studies are still going on. Early in this century (1915-25), the U. S.

"Only about 20 percent of farms and ranches that need windbreaks have adequate ones"



Bureau of Plant Industry started research plots to determine best species, spacings, and cultural methods.

Railroads played their part in tree plantings. The Great Northern Railroad planted snow traps on their rights-of-way next to cuts to minimize drifting of snow. As the railroads opened the West, tree salesmen hawked their wares to settlers within wagon or buggy distance of the depots.

The Clark-McNary Act of 1924 made tree seedlings available at cost for planting windbreaks.

Great Plains Shelterbelt

Perhaps the most publicized planting program was the Great Plains Shelterbelt of the 1930's. Because of the "Dust Bowl" conditions growing out of the drought of that time, the Forest Service was authorized in 1934 to make studies of tree-planting needs and possibilities in the Plains states.

They thought big, and the press and public enlarged upon their plans. Many people envisioned a 100-mile wide, 1,100-mile long belt of trees reaching from Canada to the Texas Plains.

Actually, foresters recommended planting field windbreaks a quarter of a mile apart within the 100-mile wide belt. These were to be 10- to 12-row patterns 132 feet wide plus a 32-foot right-of-way for maintenance. If completed, they would cover 2 million acres.

Approved by the President in 1935, the project employed Works Projects Administration and Civilian Conservation Corps labor to plant 200 million seedlings during the period of 1935-42. Added together, the plantings totaled 18,500 miles in length and occupied 238,000 acres in six states.

Harold Schwager near Orchard, Nebr., is what might be called a third generation landowner benefiting from windbreak plantings. He owns one of the first shelterbelts planted in Nebraska with technical assistance of the Soil Conservation

Service. He bought the property last spring from the Ralph Howard estate, and Ralph was the son of John C. Howard who planted the windbreaks on April 23, 1935.

The Shelterbelt Project was transferred to the Soil Conservation Service in 1942. Slowed considerably by the war years, plantings began expanding slowly during the late 1940's, primarily farmstead windbreaks. Landowners included some protective planting of trees in their total conservation plans for all the land, and soil and water conservation districts began tooling up to help do the job.

Then and now . . .

Many of the windbreaks planted in the Shelterbelt Project of the 1930's are giving effective protection to adjacent croplands today. These two examples show comparisons to U. S. Forest Service photographs taken soon after planting. At left, windbreak planted in 1939 on H. B. Steinmetz farm, Kansas; at right, planted in 1939 on Charles Johnson (now Wayne Walmer) farm, Nebraska.



Today's districts in the Lake and Plains states now own more than 450 mechanical tree planters for use by cooperators in planting windbreaks. They arrange with state and federal nurseries to provide seedlings, and some districts own their own nurseries. Districts also have 250 mechanical weeders and 200 or more sprayers for use in weed control when windbreak plantings are young.

"What happened to the shelterbelt?" was a question often asked in the 1950's. Studies made in 1954 showed 73 percent of the plantings still in fair to good condition. Se-

vere droughts in the 1950's destroyed a lot of trees in the Southern Plains. General neglect and grazing by livestock had eliminated some in the Northern and Central Plains states. Summary observations reported about half of the original plantings still effective. But they taught some valuable lessons.

The Shelterbelt Project has verified the experience of several Government agencies and many landowners that trees can be successfully grown in the Plains if certain precautions are observed. These involve the careful selection of adapted species to fit the soil and site conditions, adequate site preparation, good quality nursery seedlings, a conscientious planting job, and good cultivation and care as long as the trees live. These principles hold true for other parts of the country.

Observations made during the



The first three windbreaks planted (on the same day) by farmers, who later became conservation district cooperators in Nebraska, are now 31 years old. This one is on the Harold Schwager farm in the Antelope District.

late 1940's and early 1950's showed that 10-row field windbreaks protected little more cropland than

those of three to five rows. Narrow windbreaks result in savings in two ways. They don't cost as much to plant and maintain, and they take less land out of crops.

The planting of field windbreaks had dropped to practically zero in the late 1940's and 1950's, but it spurted up to 4,000 to 5,000 miles annually in the 1960's.

Single-row tree windbreaks have been used for many years on the muck and sandy soils of Indiana, Michigan, Wisconsin, and along the eastern seaboard. They are also planted for orchard and truck crop protection in the Pacific and Southwest states. They are presently quite popular in Minnesota, the Dakotas, and Nebraska.

People with good windbreaks value them highly. More than 200 Kansas and Nebraska farmers and ranchers, a number of years ago, were asked to put a dollar value on farmstead windbreaks. Livestock feeders said their savings averaged about \$800 a year; dairymen figured more than \$600; and those with fruit and vegetable crops said they saved \$80 to \$100 each year.

South Dakota farmers say windbreaks increase the value of their land by \$8 an acre. Bankers and real estate dealers in other states

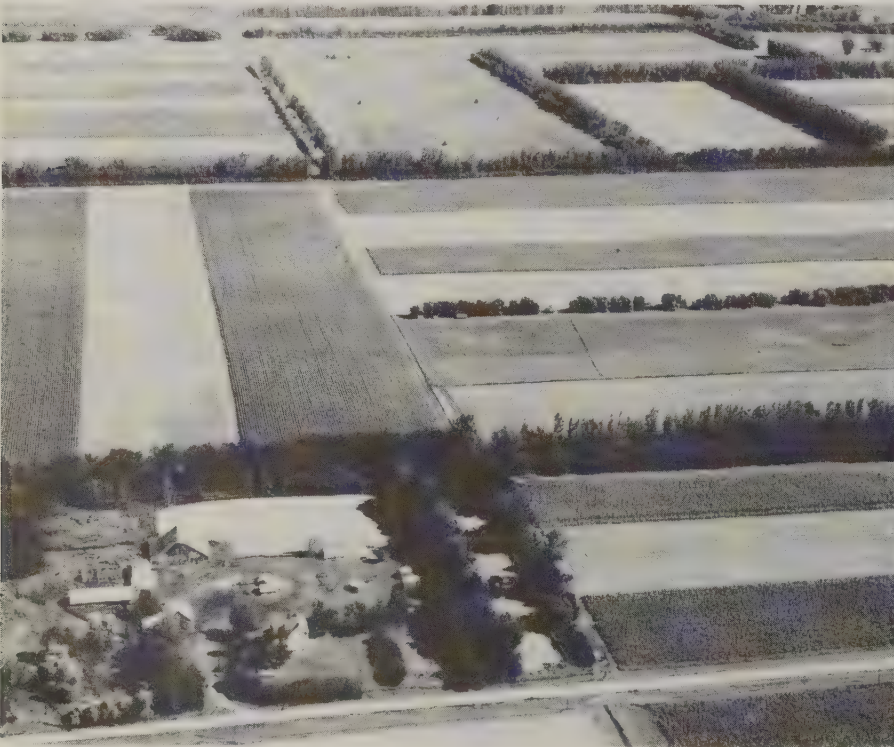


add \$1,000 to the appraised value if there is a good farmstead windbreak.

But do they reduce the wind erosion? Studies by the Department of Agriculture and Purdue University show a 35 to 75 percent reduction in wind velocity by a windbreak, depending on density. Effective protection extends from eight to 15 tree heights away. Thick, wide barriers provide a higher reduction percentage close in, but less dense ones give protection farther out. The lower the velocity of the wind, the less soil it will move. Among the highest values of field windbreaks are their role in reducing peak wind velocities in windstorms.

Windbreaks attract and shelter wildlife. State game department officials say deer are more common now in areas where there are many older windbreaks. Quail, dove, and pheasant hunters follow the windbreaks because this is where they are most likely to find game. Songbirds value windbreaks for nesting habitat and temporary homes.

Farmstead and field windbreaks combined with wind stripcropping give protection to the Vernon Swanson farm in the Brown-Marshall Soil Conservation District in South Dakota. Windbreaks continue into the distance on neighboring farms.



Windbreaks break up the monotony of treeless landscapes and lend a feeling of security to their owners. It is easier to grow shrubs, lawns, flowers, and vegetables where protected by adequate tree barriers.

Modern windbreak patterns fit the land, climate, and need of each location. In the Northern Plains, field windbreaks commonly consist of green ash, Siberian elm, and caragana. Southward, they change to ponderosa pine or redcedar and hackberry. At the southern end of the Plains, southern pine or aborvitae are a possible choice. Most of the plantings in the Lake states, Indiana, Illinois, and eastward contain the native pines, adapted spruces, and, in some localities, willows and privet. Eucalyptus is common in windbreaks in California; local pine, firs, and spruce are favored in the Northwest; and the southern pine is good in the South.

Farmstead and feedlot protection

plantings use these same species, but they may have fruit and ornamental plants added. This type of planting has seven or eight rows in the Northern Plains and four or five rows in the South. Species of special value to wildlife are often added.

In the Nebraska Sandhills, ranchers plant "outdoor barns" to protect livestock on the open range from blizzards. These usually consist of 15 to 30 rows of native pine and eastern redcedar. Several hundred are established each year.

In many older plantings, volunteer seedlings are commonplace. These will replace the older trees as they die.

There are, of course, some problems in establishing windbreaks. There is an urgent need for faster growing, bushier, longer-lived species or improved types of the common species used today. Careless use of chemicals for killing weeds in grain crops sometimes results in damage to windbreaks. And people are sometimes too impatient for results to plant the better, slow-growing species. The fast-growing kinds are short-lived and in a few years the planting is no longer effective.

Despite all the efforts of homeowners and public and private agencies, only about 20 percent of farms and ranches that need windbreaks have adequate ones. Instead of planting by hand, we now can use machines. Instead of hoeing and pulling weeds by hand, we can do the job with machines or safe chemicals. In many counties the Agricultural Conservation Program cost-shares the planting of needed windbreaks, and good quality seedlings are available from private and state nurseries at reasonable cost.

More and more people with jobs in towns and cities want to have a home and a small acreage in the country within driving distance. They welcome windbreaks as a part of their surroundings since the small investment they make in tree planting pays such handsome dividends in helping to make a home instead of just a place to live. ♦



Southern Pacific Railroad planted tamarisk as a windbreak (above) to prevent blowsand from damaging rolling stock and rails. Much sand originates from around buildings in the desert (below).

Windbreaks of tamarisk lead railroad safely through the desert

By Frank L. Brooks, Jr., and Robert Dellberg

Regional agronomist and state woodland conservationist, SCS
Portland, Oreg., and Berkeley, Calif.

A 20-mile long windbreak of tamarisk trees, some of them grown 35 feet high in 9 years, helps keep Southern Pacific trains rolling across the Southern Desert in California.

The windbreak, combined with dikes to trap the blowing sand, is the solution worked out by SCS conservationists and railroad officials to a problem that has plagued the company since 1879.

A savage land

In 1960, railroad officials sought guidance through the Coachella Valley Soil Conservation District in its efforts to control windblown sand on its roadbed and sandblasting of its rolling stock.

The Upper Coachella Valley

where the railroad crosses the desert is a land of great and strange contrasts. Temperatures range from 13° to 125° on the valley floor. Rainfall is nil for most months of the year with an annual average of only 4 inches. Blowing with savage velocity, winds pick up sharp sand and literally sandblast everything in their path. Climatic wind-erosion factors for this area are five to 10 times as severe as those of the Great Plains.

In recent years, the wind-erosion problem has become even more severe because the sandy soil has been exposed by road and highway construction and by development of nearby residential subdivisions.

The effect of a sandstorm is almost unbelievable to those who have

never experienced one. The sand is a sharp, abrasive quartz material. Moved by winds up to 30 or 40 miles an hour, the particles cut off wooden utility poles and fence posts, abrade metal, and severely scour glass.

The sand collects around cross ties in the roadbed. Trains passing over the track create movements that cause the wooden ties to wear and loosen iron spikes and plates securing the rails. Abrasive sand between the surfaces of wheels and rails causes rapid wear to the track.

Track replaced

Ten miles of track have had to be replaced at a cost of several million dollars. Accumulation of sand in switches and other effects on

safety required trains to be operated at slower speeds than normal.

When the railroad became a co-operator with the Coachella Valley District in 1960, dikes were constructed to provide traps and storage areas for blowing sand. A single row of tamarisk cuttings was planted on each side of 10 miles of railroad right-of-way. More than 70,000 cuttings were used at a spacing of 18 inches apart to insure dense growth. Tamarisk is well adapted to hot dry desert areas. Introduced to California from western Asia, it is tolerant of salty soils, poor quality water, limited or intermittent supplies of moisture, and temperatures as high as 125°F. Its deep extensive root system and rapid growth rate make it a good windbreak tree and its evergreen growth characteristics make it effective throughout the year.

A water jet probe, devised to "dig" holes in the dry, rocky, sandy soil, provided an initial irrigation as planting proceeded. Boards placed on the windward side protected the tender growth, and picket fences prevented drifting sand from burying the plants.

Irrigation and fertilizer

The windbreak was irrigated at 5-day intervals with water containing fertilizer. Pumps delivered the water from a well through pipelines along both sides of the 10 miles of track.

The initial planting produced a continuous row of trees on each side of the 10 miles of railroad. Additional plantings have been made along both sides of another 10 miles, and the company plans to add still more.

When the trees achieved the desired height, irrigation was reduced in frequency and amount. Maintenance requirements have been small.

As a result of the success of these plantings, the Coachella Valley District has received hundreds of applications from area landowners for assistance in sand control. ♦

Plot studies relate growth of windbreak trees to soils

Study plots scattered the length and breadth of the grassland region of central United States are giving the Soil Conservation Service sound guides as to which trees and shrubs will succeed on which soils in the area where trees naturally are the exception rather than the rule.

These studies, started about 10 years ago, are located mostly in the Plains and Prairie states where much windbreak planting has been underway.

SCS now has about 1,100 sets of plots in 12 states providing growth data on nearly 40 species. Since an average of six species are sampled in each study plot, they add up to around 6,000 sets of measurements. Work on this project continues on a limited basis, and future studies will be conducted where most needed.

For these studies, teams consisting of a forester and a soil scientist select windbreaks growing on the more important soils or soils that present special problems. The plantings selected are at least 15 years old, and have had reasonable care during their life span. The study plot within each selected windbreak must be on a single kind of soil.

The forester makes sure that the sample area is representative of the growth and performance for each species on the soil unit. He measures and records the diameter, height, crown spread, and many other data about each species of tree and shrub. The soil scientist sees that each sampled area is representative of a soil taxonomic unit and that each unit is within the central concept of the described and named soil studied. He also studies and records the plot's soil profiles to a depth of at least 5 feet, or to 8 feet on sandy soils, along with many other soil data.

The study plots consist of a cross-

section segment of the windbreak, usually 25 plant spaces in length. They are identified so they can be located easily for remeasurement and later evaluation if needed.

The results from these studies provide information for projecting the expected future performance of adapted trees and shrubs when planted on known soils; guides for selecting species to plant in windbreaks when the soil and climate are known; and other information for use in technical guides and soil survey reports. Also, data are assembled and analyzed for selected benchmark soils to serve as guides for windbreak interpretations for other similar soils.—ARTHUR E. FERBER, regional forester, SCS, Lincoln, Nebr. ♦

SCS Scientist Kenneth Good and Forester Jim Carr study how fast and well trees grow in a soil study plot.



Windbreaks protect and beautify Ohio landscape

By A. N. Quam

Woodland conservationist, SCS, Columbus, Ohio

Even though the song, "Beautiful Ohio," was written about the river that flows along the south-eastern border of the state, the surrounding topography must have added some of the inspiration. Undoubtedly, southeast Ohio is the most scenic half of this industry-oriented state. The terrain rolls out to a panorama of crops, pastures, and extensive woodlands. Here strong winds are buffered by trees and ridges.

It's another story to the west and north where the topography "gentles out" from undulating to flat; trees are fewer and farther apart; corn and soybeans have captured the land—and the wind hits one square in the face!

Northwest Ohio was not always open to eroding winds.

Ohioans point out that here once was a broad land of trees. It would become so again, if left undisturbed, as plainly attested by the idle lands bordering the cities.

Trees are cleared

History records that 95 percent of the state was originally a forest of the finest wood species. Oaks, hickories, chestnut, tuliptree, walnut, cherry, elms, ashes, cucumber, maples, beech, and even some white, shortleaf, and Virginia pines—all these and more were represented. They still are—only the abundance and quality are missing.

Ohio's early settlement com-

menced about 1800 and gained momentum after 1825. Settlers had to battle the forest to survive. Each family laboriously cleared land to grow food crops, and by midcentury the deforestation was in full swing. Manifestations of this battle survive to this day in northwest Ohio as long-conserved woodlots grudgingly give way to bulldozer and axe.

Windbreaks return

After the 1850's there were sporadic efforts to reestablish trees around farmsteads—obviously for protection. A 110-year-old multi-row planting of eastern redcedar protects a farmstead in Hardin County, midway between Toledo and Columbus. A number of 70- to 90-year-old Norway spruce wind barriers stand today in northern and western Ohio. There are also several Scotch pine and catalpa plantings of the same age in that area.

Farmstead windbreak plantings continued into the present century on a limited scale. Windbreaks and "block plantings" for forestry purposes increased in the mid-1930's on the rekindled conservation wave of that depression era.

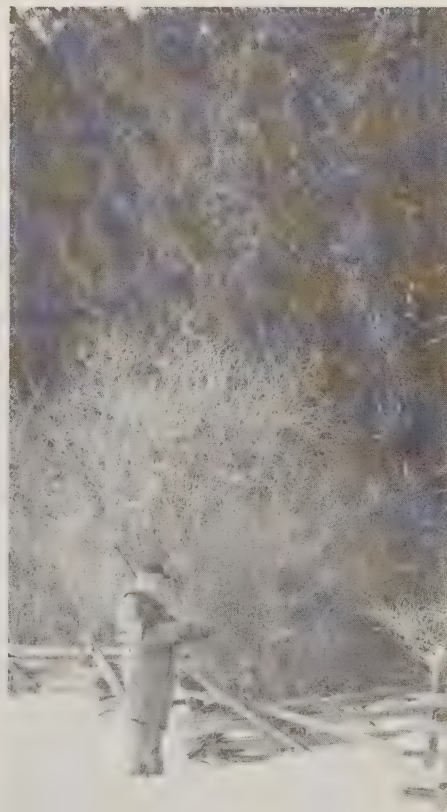
Assistance for planting

Recent years have seen an acute awareness of the need for tree planting on the northwest Ohio landscape. Technical specifications have been developed by SCS in cooperation with the Ohio Division of Forestry



A 3-year-old Norway spruce windbreak combines with a pond to create hospitality on a farmstead in Williams County.

Four rows of red pine, white pine, Norway spruce, and mixed shrubs planted in 1932 protect a farmstead in Fulton County.





A farmyard in western Ohio sheltered by 10 years of tree growth.

and Reclamation and the Ohio State University Cooperative Extension Service. Cost-sharing assistance to landowners has been made available through the Agricultural Conservation Program.

Minimum cost-share specifications for farmstead windbreaks in Ohio call for two rows of conifer trees plus one row of shrubs. A minimum distance of 75 feet between the nearest row and the closest major protected object or area is also specified. This latter is to provide space for snow catch and eddy effect. Use of larger size, older, balled and burlap planting stock, though not required, is nevertheless supported by larger cost-share payments to encourage wider landowner

participation. Field windbreaks, to date, are popular mainly in the muck crop areas.

Wildlife packets

Considerable impetus is also given to wind protection and landscape beautification by use of the so-called wildlife packet program. In this effort several contiguous soil and water conservation districts cooperate to provide "packets" of 50 to several hundred ornamental and wildlife tree and shrub seedlings. This program is very popular in Ohio, especially with agricultural residents who have only limited space for planting trees. There are enough conifer and shrub seedlings in every packet to start a windbreak

that is attractive to small game, songbirds, and people. Seedlings are purchased in bulk from nurseries and rearranged into packets for delivery to district cooperators.

Interest in windbreaks and other landscape enhancement plantings has enjoyed a definite revival in Ohio's "corn - soybean - vegetable belt" during the past decade. Northwestern Ohio in its own particular style rivals the southeast in terms of attractiveness and definitely deserves recognition for its contribution to a "Beautiful Ohio." ♦

Good grassland program restores farm

A good grassland program helped transform a former dairy farm to a cattle-producing enterprise in St. Martin County, La.

District Cooperator Frank Simon had to close his 61-acre dairy farm because of poor pastures. He retained a few head of low-grade cows to start a commercial beef herd.

A soil survey showed that the entire farm was well adapted to most grasses and legumes. Under an ACP practice designed for low-income farmers and with the help of the Soil Conservation Service, Farm Manager Stephen Simon adopted a program of bahiagrass and fescue-grass seeded with S-1 clover.

The St. Martin Soil and Water Conservation District equipped to do pasture work on its cooperators' farms deep plowed, chopped, and fertilized all the fields. Two tons of lime an acre was applied and all pastures seeded as planned.

Grasses and clovers have come up to a good stand, and the farm is a going enterprise again. ♦

Balled and burlap stock offers protection after only 2 years. A row of mixed shrubs (left) supplements two rows of Scotch pine on the windward side.





Conservation—today's frontier!

Scout Jamboree challenges 30,000 boys to work toward intelligent use and care of natural resources

Statement of commitment

We have a concern for the loss of our natural resources as evidenced by the pollution of our streams, lakes, and the air we breathe, the diminishing wildlife, plants and trees, and the erosion of our soil.

We commit ourselves to the intelligent use of our natural resources through our personal actions and in cooperation with our fellow Scouts and to informing the public about the seriousness of the problems.

The following kinds of projects are recommended:

Seek out the resources of the conservation agencies in our communities to determine restorative projects which we can handle, and carry them out.

Invite representatives of the natural resources agencies to meetings in which to inform Scouts as well as the general public about the common practices which are dangerous to the preservation of natural resources in our communities.

Make a greater emphasis on the Outdoor Code among Scouts by setting up demonstrations and displays in our Scout units and for the public which describe what is expected of each Scout.

During that historic week in July when men first walked on the Moon, more than 30,000 Boy Scouts and Explorers at their 7th National Jamboree were discovering the exciting frontiers of resource conservation on Earth. They learned intelligent use and proper care of the natural resources upon which the whole human family depends is a frontier even more complex and challenging than space exploration.

Farragut State Park, a 5,000-acre reserve on the shores of beautiful Lake Pend Orielle in northern Idaho, was the site for the once-every-4-year national Scout event, July 16–22. As a result of their week-long learning experiences at Farragut, concern for the proper care and management of our Nation's natural resources was the second among seven major national commitments to action formulated by the Scouts and Explorers as they interpreted their overall Jamboree theme: "Building to Serve." Each boy had a role in determining the issues considered for the statement as a part of an exercise in the democratic process. From discussions in every camp, the 19 young leaders of the All Jamboree Forum developed the statement of commitment that each Scout pledged to carry

home as a call to conservation action for young people.

The conservation instruction and exhibit area, most popular of all 1969 Jamboree program areas, was developed and manned by some 40 private, state, and federal resource agencies and organizations working with Ted Pettit, director of conservation for the Boy Scouts of America.

Throughout the Jamboree at 30 identical basic conservation instruction stations, Scouts in groups of 40 were given an hour-long lesson in the relationships among resources and principles of conservation. Specially trained professional conservationists from agencies, including the Soil Conservation Service, Agricultural Research Service, Forest Service, and Department of the Interior bureaus, used enlargements of 24 visual aids prepared by SCS Illustrator Felix Summers in presenting lessons around the theme "Conservation—Your Choice."

To learn how conservation directly affected them, more than 30,000 Scouts and visitors voluntarily went to a separate conservation demonstration and exhibit area where 19 state and federal agencies had special conservation learning stations. Here SCS developed the

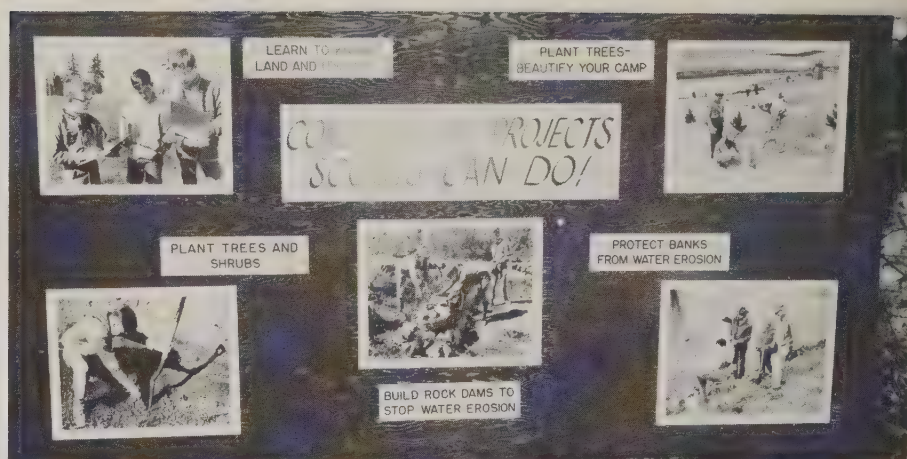


"Conservation — Today's Frontier" trail, featuring two model watersheds prepared in cooperation with the Idaho State Soil Conservation Commission and the Idaho Association of Soil Conservation Districts. The first model depicted natural resources as they appeared on a typical western watershed before the arrival of hunters, loggers, and settlers. The second model of the same watershed as it appears today showed how man could and has developed the watershed resources according to conservation principles in order to meet the needs of people. Scouts were challenged to think in terms of land and water use in the future as the demands of thousands more people in far away cities and on the watershed itself must be met. Then, they realized that conservation management was indeed today's frontier.

After studying a series of seven soil monoliths illustrating the need for accurate information about soils in order to use them intelligently, Scouts had an opportunity to make their own artificial soil profiles from supplies of basalt, decomposed granite, clay, and surface soil. More than 5 tons of northern Idaho soil was carried home by the nearly 20,000 Scouts who constructed soil profiles in 1-inch diameter plastic tubes.

Farther along the SCS conservation frontier trail, boys saw a vivid demonstration of the value of plant cover and mulch in preventing soil erosion by water. They learned of the damage to water quality when bare soil erodes and moving water carries sediment into streams and lakes.

The importance of the predator's role in the natural world and some concepts of wildlife ecology were discussed at the SCS station where the art of falconry was demonstrated. In viewing a 35-foot color mural of conservation practices that benefit wildlife, Scouts learned of wildlife's basic needs and how good land management provides for these needs.



Ideas for conservation projects suggested by photos (top); Scout Edwin De Priest (center) was surprised to see his home farm near Palmer, Alaska, in the SCS "America the Beautiful" series.

Model of a typical western watershed (right) as it appeared about 200 years ago shows the natural resources then. Model of same watershed (next right) as it appears today under conservation management, meeting the needs of thousands of people.





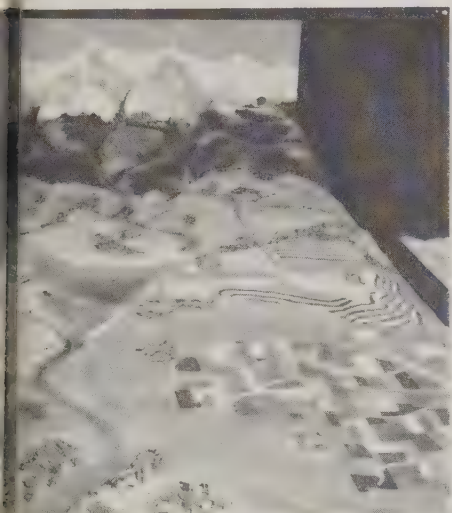
An interesting lesson in water-resource management and conservation was depicted by a full-color mural of the snow survey and water-supply forecasting activities of SCS and the exhibit of over-the-snow vehicles and other tools used in this work. At a series of six large panels developed in cooperation with the University of Idaho, Scouts could study six different plant communities of northern Idaho as they were related to particular kinds of soil.

Giving full-time assistance to the SCS instructional staff at the Jamboree were Doyle L. Scott, administrative officer of the Idaho State Soil Conservation Commission, and three Explorers, Pat Benson, Tyler Nelson, and Paul Ralstin, all of Boise, Idaho.

As they carried home from the 7th National Jamboree their personal commitments to action in behalf of conservation, Scouts could well recall the closing words of their conservation lessons: "We have a choice in the changes made by man in our environment, if we but use the intelligence that sets man apart from other creatures with which he shares this world and thereby places upon him a great and inescapable responsibility for taking good care of the earth." ♦



More than 20,000 Boy Scouts assembled their own miniature soil profiles (above). Scouts and their leaders (left) intently study the young male goshawk held by Explorer Pat Benson. SCS Hydraulic Engineer Evan Merrill demonstrates action of falling raindrops' on bare soil, mulch, and grass-covered plots to show the importance of cover.



Artist-farmer pioneers use of windbreaks on muckland

By George W. Alley
Forester, SCS, Madison, Wis.

Red sunsets disturb Dean Kincaid, Wisconsin muck farmer. The beauty appeals to his training—he studied to be an artist before he started farming—but he knows all too well that such sunsets can result from dust in the air. And that spells trouble to a muck farmer.

“A farmer can’t afford to have his soil blow,” says Kincaid, “so he goes to great pains to prevent it. When I began farming in Wisconsin, I rented a sandy field and planted onions. Though the onions were planted 3 inches deep, a single big windstorm left them on top of the ground. My neighbor’s yard to the east was covered with sand.”

“So in developing the 1,200-acre muckland farm near Palmyra, I went back to my home state, Mich-

igan, for willow cuttings to start windbreaks.”

A choice of willows

The Michigan willow grew well and did the job, but it had some undesirable traits. The broad tree crowns robbed crops of sunlight and dropped numerous twigs into the vegetables. Kincaid has since tried various willows and other trees and shrubs. Many of these came from the Soil Conservation Service plant materials centers through his cooperation with the Jefferson County Soil and Water Conservation District. Extensive trial plantings have been maintained on the farm since 1955.

Kincaid specializes in raising carrots, mint, and onions, but he is also a plant hobbyist. “When he

gets into a nursery, he is like a kid in a candy shop!” exclaims Mrs. Kincaid. Mixing his hobby with business, he has tried many kinds of trees and shrubs in the 5 miles of windbreaks he has planted to break the windflow over the organic soils he farms.

Dean has made willow cuttings available to other Wisconsin farmers for the taking. He gives new hands at the game the benefit of many years’ experience of coping with wind damage to soil. This is a big item in a state where extensive muck and sand farming give the state a high ranking in the Nation’s vegetable production.

A pruner at hand

Kincaid always keeps a pruner in the pickup truck as he travels about his farm. With this pruner he can clip a willow cutting and plant it in a matter of minutes. There are few holes in the Kincaid windbreaks.

Of the many barrier materials he has tried, Kincaid rates the laurel willow (*Salix pentandra*) as best. Norway poplars (*Populus canadensis eugenie*) have done well. Almondleaf willow (*Salix amygdalina*) was planted first, but it had

Dean Kincaid (left) takes a willow cutting with pruner. Newly constructed drainage ditch alongside of windbreak of Norway poplar with shrub row in front.



too many shortcomings. A variety of white willow (*Salix alba vitellina*), an attractive small tree the Kincaids spotted while vacationing in North Dakota, flourished and looked promising, but it proved too short and spreading to fit the needs of a muckland windbreak.

Siberian crabapple (*Malus baccata*), buffaloberry (*Shepherdia argentea*), and Russian-olive (*Elaeagnus angustifolia*) are small trees or large shrubs that have performed well as windbreaks and are valuable for wildlife. Best performing shrubs were lilac (*Syringa*), zabeli honeysuckle (*Lonicera korolkowi zabeli*), and cotoneaster (*Cotoneaster acutifolia*). Conifers as a group did poorly on the organic soils, but the most successful were blue spruce (*Picea pungens*) and Austrian pine (*Pinus nigra*).

The Kincaids have been cooperating with the Jefferson County District since 1953. Open and tile drains, surface drainage, dikes, and a pump drainage system, all in addition to the miles of windbreaks, are some of the practices in his conservation plan.

For wildlife too

The Kincaids point with pleasure to the 5 miles of planted wind barrier that provides excellent habitat for songbirds and other wildlife. A deer herd in the vicinity has greatly increased in the past few years.

Clearing, draining, and leveling the land and establishing windbreaks cost money and add up to a large per acre investment. Crop yields are high, but so is cost of production. Muck farmers are reluctant to set aside their expensive land for windbreaks. Dean Kincaid is no exception. He plants his barriers on ditchbanks or along access roads to reduce acres of cropland occupied by windbreaks.

"Windbreaks are a necessary part of my wind-erosion control system," says Dean Kincaid. "They supplement other measures such as cover cropping and timely sprinkler irrigation." ♦

Developer bases plans on soil survey

Plans for "At-Wood-Akers" subdivision sewage system near Crowley, La., are based on soil information provided through the Acadia Soil and Water Conservation District.

When Frank Atwood and his son, Frank, Jr., decided to convert their 160-acre rice farm to a residential development, they sought counsel from several private sources and government agencies, including the conservation district and Soil Conservation Service.

The Acadia Parish Soil Survey provided the data they needed to lay out sewerlines, streets, and 66 homesites. Preliminary study showed that wet soils and low percolation rates could hinder septic tank performance.

In keeping with known limitations for Crowley silt loam, the Atwoods decided to install an oxidation pond—the safest, most efficient method for this soil type. The odor-free central sewage system (a

shallow lake that holds sewage long enough for bacterial decomposition) has been used successfully in other modern subdivisions beyond municipal sewerlines.

The 200- by 300-foot pond holds 5 feet of water with a 2-foot freeboard. It will be fenced and landscaped; adjoining land will become a park.

The Soil Conservation Service is also helping lay out roads and stormwater disposal systems. The SCS also contributed interpretative material for a leaflet about local soil characteristics of interest to new homeowners.—GEORGE W. GUILLORY, district conservationist, SCS, Crowley, La. ♦

At right, District Conservationist George Guillory (left) and Frank Atwood, Jr., discuss plans for a park in At-Wood-Akers. Below, road construction began after a study of soil survey data showed the best locations for streets and homesites.



Windbreak planting is big operation for districts

By W. H. Youtz

State resource conservationist, SCS, Huron, S. Dak.

Soil conservation districts are making big business out of windbreak planting in South Dakota by providing stock, equipment, and planting crews to district co-operators.

Last year nearly 3,000 farmers in the state made windbreak plantings of trees and shrubs. About two-thirds of the co-operators had planted windbreaks before.

About 90 percent of the 3 million trees planted each year protect additional land; 10 percent are renovation plantings or fill-ins for present windbreaks. Two-thirds of the plantings are for farmstead or feedlot protection, the others to protect cropland.

Of the state's 70 conservation districts, 60 employ tree planting crews each spring. Most districts have their own tree-planting equipment, including planters, tractors, trucks,

and the like, worth a total of about \$150,000.

In addition, districts have another \$45,000 invested in storage facilities for young seedlings. The Corson Conservation District in north-central South Dakota purchased a service station and converted it into a mechanically refrigerated tree seedling storage unit that will handle up to 100,000 trees. Walworth, Spink, and other districts also plan to have improved refrigerated storage facilities ready for the 1970 tree planting season.

One conservation district rents a tree planter, another contracts the tree planting, and a dozen or so provide custom cultivation or chemical weed control to co-operators for windbreak plantings.

A typical district in the "windbreak business" will spend \$2,000 for tree stock each year, \$1,000 to

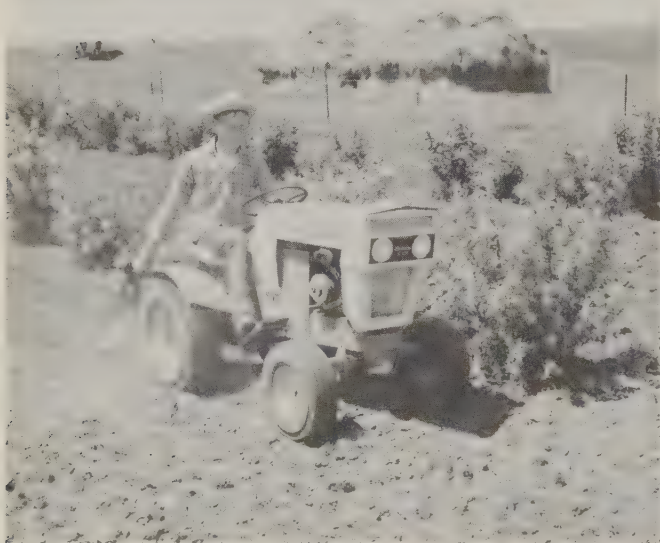
employ a 2- or 3-man planting crew, and several hundred dollars on gas, oil, and repairs for tree planting equipment. The district charges co-operators enough to cover costs and maintain and replace equipment. The farmer in turn gets a quality job at a minimum cost.

The State Forestry Division nursery supplies most of the conifers. Most hardwood tree and shrub seedlings come from commercial nurseries.

The need for establishing new windbreaks will continue for many years, according to Orlow Eidam, president of the South Dakota Association of Conservation Districts. Each year, the boards' supervisors estimate their nursery stock needs for the coming 3 years. These estimates, furnished to nurseries, reflect annual increases in planting rates and cover more than 40 species of trees and shrubs.

Technical assistance and training is provided by the Soil Conservation Service, the South Dakota Game, Fish, and Parks Department, and the State Extension Service. The Agricultural Conservation Program and the Great Plains Conservation Program provide cost-sharing for windbreak establishment. ♦

Taking care of the tree plot (left) is included in the family chores on the Casper Malsom farm in the Ipswich District. A planting crew (right) puts in ponderosa pine for wildlife according to the conservation farm plan of Leonard Kriz in the Carter District.



The computer in river basin planning

By S. Glade Wilkes

Hydrologist, SCS, Carson City, Nev.

A computer program set up by the Soil Conservation Service for the Central Lahontan River Basin Type 4 Study in western Nevada and eastern California made possible a degree of detail that otherwise would have been impractical. The computer program was developed at the Desert Research Institute at Reno, Nev., to reflect the basin's water resources and needs.

Most of Nevada has an arid or semiarid climate, with an annual precipitation of less than 10 inches, and water is a vital factor in the state's economy. The purpose of the study was to inventory the present and potential water resource of the basin and determine the extent to which its present use, mainly irrigation, could be increased. The U. S. Department of Agriculture's field party for the Type 4 Study included in the investigations and analyses a water-budget type inventory of water resources similar to that completed for the Type 4 Study of the Humboldt River Basin in Nevada.

Since the Humboldt Study required many hours of manual computation, the need for a less time-consuming method of making the inventory was evident and prompted the development of a computer program that would simulate the annual hydrologic cycle for the Central Lahontan River Basin.

The computer program included establishing realistic precipitation amounts over the area concerned and developing a relation between precipitation, soil moisture, runoff, evaporation, and transpiration. These data would lead to the preparation of precipitation- and water-yield maps and an inventory of water depletions by six major categories: native vegetation, stream bottom lands, irrigated lands, phreatophyte areas, water surface and rockland areas, and municipal and industrial use.

The Walker River drainage system (2,733,000 acres) within the Central Lahontan Basin was subdivided into 19 subwatersheds and

each evaluated separately. Precipitation and temperature data from representative weather stations were then projected over the area. Temperature and precipitation values dictated whether the occurrence of precipitation was rain or snow and whether the snow pack was accumulating or melting. The basic unit of time used was ½-day periods, daytime and nighttime, to account for the significant differences in rates of snowmelt. A reconnaissance soil survey provided the necessary data on soil water-holding capacity and type of existing ground cover. Evaporation and evapotranspiration computations reflected the soil moisture, vegetation, and climatic conditions. All input data in the program were developed by elevation zones.

The resulting output data reflected the contribution or depletion by specific geographic locations within the subwatershed. Simulated runoff by elevation zone and other factors were accumulated, producing totals for each watershed. Finally, the developed runoff data were checked against streamgage records, wherever available, to confirm results.

The speed of computers made possible a simulated water budget from daily climatic data recorded for several years. These data were checked against actual streamgage records wherever feasible. When consistently close comparisons occurred, it was assumed that a relatively reliable water yield and use relationship had been determined for the subwatershed. This way data on water yield and depletions were prepared for the 19 delineated watersheds in the Walker River system. This program is being used for the Truckee and Carson rivers, the remaining two river systems in

One of the high water-yielding tributaries of the Walker River Basin extends to a maximum elevation of 11,500 feet.



the Central Lahontan Basin of western Nevada and eastern California.

The computer program was designed so that the established water budget of a watershed for present conditions could be modified to reflect future conditions. This versatility provided added information for two proposed reservoirs in the Walker River system and gave some insight into the effects of improved agricultural water management.

A big IBM computer became the workhorse after initial development and testing of the program showed a need for larger capacity equipment to handle the complexity of a satisfactory water-budget analysis. The current program can process 10 years of data for any one of the sub-

watersheds in about 5 to 10 minutes. Experience with the Walker River Basin showed that it was necessary to process four or more combinations of interrelated parameters to determine the ultimate water resources available for future development. Computational requirements for these comparisons would be far beyond any practical consideration of manual computations.

This computer program makes it possible to develop water yield and depletion data from rather limited basic information. The program is widely adaptable to other areas that lack water-yield information and for this reason is being evaluated by Soil Conservation Service specialists for a Servicewide program. ♦

aged community leaders to pay special attention to soil and water conservation for 7 days in May.

The ladies put up displays in public places, wrote news releases, and prepared television and radio programs. They urged mayors to sign proclamations, engaged speakers for civic organizations, informed and entertained clergymen, worked with garden clubs, and contacted schools.

On Monday morning, May 12, students in 55 schools in the Northeast Soil and Water Conservation District heard their student body presidents read a brief speech written by Mrs. J. K. Tillotson, wife of an honorary supervisor.

Auxiliary members hope that they'll be asked to help ready the state for another week of serious thought and talk about conservation next year. ♦

Conifers gain in windbreaks

The kinds of trees and shrubs being planted for windbreaks in the Great Plains are changing with time. Nowhere is this so evident as in Nebraska where the trend now is to use all conifers in protection plantings. Conifers' greater density reduces wind velocities and traps and holds snow within the belt.

In the Prairie States Shelterbelt Program in the thirties, and in the early-day Soil Conservation Service demonstration windbreak plantings, broadleaf trees made up about 80 to 90 percent of the plantings. In the years since these early plantings, many more conifers than broadleaves have been planted in windbreaks.

For example, broadleaf trees used for windbreaks in the years 1949, 1959, and 1968 made up 72, 28, and 12 percent of the total; shrubs 17, 7, 5 percent, respectively. Conifers, in comparison, amounted to 11, 65, and 93 percent, respectively, for the same years.

Eastern redcedar, ponderosa pine, Austrian pine, Scotch pine, Rocky Mountain juniper, and blue spruce are the conifers used most.

Good conifer seedlings available at a reasonable cost, Government

cost-sharing programs, and improved methods of storage and handling are factors affecting this trend. With technical assistance in planning from the Soil Conservation Service, most of Nebraska's soil and water conservation districts handle and plant trees and have special storage facilities to hold conifer seedlings safely until planted.—JAMES W. CARR, JR., forester, SCS, Lincoln, Nebr. ♦

Women promote Stewardship Week

Some Louisiana district supervisors had a helping hand from their wives during the 1968-69 campaign for Soil Stewardship Week this spring.

Conservation was a prime topic of conversation among members of the Ladies' Auxiliary of the Louisiana Association of Soil and Water Conservation Districts after Mrs. Clyde Hoyt (president) called them to action last October.

Women answered Mrs. Hoyt's challenge in nearly half of the 29 districts. All winter they encour-

Many lakes for flood prevention and fun

Some 5,000 watershed lakes and reservoirs have been built by local communities with the help of the Soil Conservation Service. The 5,000 mark was passed during the fiscal year ended June 30 as several hundred new lakes were added to the total of 4,900-odd watershed lakes already on the land.

Although only 1 percent of the lakes were originally designed with recreation in mind, almost 99 percent of them are now used to some degree for outdoor fun. Some of the lakes, varying in size from less than 10 acres to 1,800 acres, have become the nucleus for new or enlarged public parks. Many have provided communities with their first and only chance for water sports.

The basic purpose of almost all the lakes is flood prevention, but recreation is an "official" second purpose at 50 lakes where local watershed project sponsors are paying at least half of the added costs. These 50 lakes provide an estimated 4 million user days of water-based fun annually. ♦

Conservation in action . . .

Forest added to college's resources

Copiah-Lincoln Junior College is beginning to put some of its idle acres to work in a tree-planting program near Wesson, Miss.

This year 40,000 slash pine seedlings were planted and 2 miles of permanent access roads were built on an estimated 48 acres of college property. The project is part of a conservation plan developed by SCS in cooperation with the Copiah County Soil Conservation District.

College officials and trustees decided that land formerly in crops and pasture would be of more value to the college if converted to timber. The change in land use would also help curb erosion that has been a constant problem in the hilly tract.

The newly established forest may serve some educational purposes while it is growing and then sold later to provide income for the school.

Roads will serve as firelanes and trails where students and teachers can stroll and enjoy this example of conservation at work in their own county.

Crown Zellerbach, Inc., agreed to furnish the trees if the district would arrange to have them planted. SCS contributed soils information for the site and the Mississippi Forestry Commission provided personnel and equipment to do the job.—CECIL REEVES, *conservation technician, SCS, Hazelhurst, Miss.*

Alabama

District's rented grass planter proves popular

Cooperators with the Lawrence County Soil and Water Conservation District can rent a planter when they're ready to improve pastureland with bermudagrass.

Ninety-nine farmers have planted more than 400 acres of palatable,

perennial forage since the district board bought a two-row mechanical sprigger in 1967.

Supervisors selected the high-yielding, dependable Midland variety after searching for a grass that would last through the long, hot summer. Their sprig source is the Tennessee Valley Authority nursery at Muscle Shoals, Ala.

Hadley Key, an enterprising cooperator, bought a bermudagrass digger to go with the rented planter. He has planted more than 200 acres for neighbors on a custom basis.—CHARLES T. MATHEWS, *district conservationist, SCS, Moulton, Ala.*

Oklahoma

Grazing acreage increases as brush disappears

Lush weeping lovegrass now covers 48 acres of pastureland owned by Vernon Breckenridge of Okeene. It was once choked with brush so thick a man couldn't walk through it.

"Two years ago one cow couldn't live on that land," Breckenridge said. "But I plan to graze 10 to 12 cows and calves there next summer." He cleared the area in 1967 with the aid of the Great Plains Conservation Program.

Breckenridge's 420-acre farm

At right, district's bermudagrass sprigger. Below, Vernon Breckenridge (right) shows Harold Welch, SCS, one season's growth of weeping lovegrass.

near the Cimarron River is covered by his Great Plains contract. He has been a cooperator with the Cimarron Valley Soil and Water Conservation District since 1964.

Other types of tame pasture included in his year-round forage program are Midland bermudagrass, small grains, and native grasses.

Breckenridge also practices good soil and water management on his father's 273-acre unit and some rented acreage. Rotations of small grain, mung beans, and cowpeas grow on 624 of the 1,120 acres in his entire operation.

The former vocational agriculture teacher returned to full-time farming in search of personal satisfaction and a country home for his family. In the future, he hopes to convert from a 100-cow commercial operation to 150 head of registered Polled Hereford cows.

In addition to responsibilities on his own ranch, Breckenridge served his community as committeeman on the Kingfisher County Agricultural



Stabilization and Conservation Committee after being elected in September 1968.—ALVIN M. CLEMENTS, *assistant state conservationist, SCS, Stillwater, Okla.*

Nebraska

Sound management stretches range capacity

Windbreaks, wells, and 20 years of work have more than doubled the carrying capacity of Gerald (Jerry) Bammerlin's ranch in northwest Keya Paha County, Nebr.

Grazing capacity for Bammerlin's 4,400-acre cattle operation in the K-B-R Soil and Water Conservation District has climbed from 2,042 to 5,280 animal-unit-months a year without a corresponding loss of range quality. Rotation-deferred grazing, proper grazing distribution, and grass interseeding have eliminated unevenly grazed conditions that held him back originally.

Bammerlin started out with 210 head, two range wells, a small lake, and a creek. He became a cooperater in 1954 and later served as a district supervisor for 6 years.

With cost-sharing made possible by a Great Plains Conservation Program contract signed in 1959, he put in 6 miles of cross-fencing, four livestock wells, and 8 acres of livestock windbreaks. Now he has 14 wells and 35 acres of trees that have proved their value many times.

Bammerlin attributes a two-thirds

increase in yield of feed and forage on 236 acres of cropland to improved rotation, meadow subirrigation, legume seeding, and other practices. He won the K-B-R District honor award in 1966 for his conservation achievements.

Bammerlin is chairman of the Keya Paha County Agricultural Stabilization and Conservation Service Committee. He has served as a consultant to local chapters of 4-H and Future Farmers of America.—TED F. CLAPPER, *soil conservationist, SCS, Ainsworth, Nebr.* ♦

Michigan

Project measure honors local mailman

A new fountain in Scottville's Riverside Park is Mason County's first entry on the list of accomplishments within the Northwest Michigan Resource Conservation and Development Project.

Rigel memorial fountain was dedicated on Memorial Day—8 months after the 13-county project was authorized for planning assistance. It gives residents another reason to be proud of a park they have created and are still improving.

Construction funds were donated by friends of Donald "Donnie" Rigel, a rural mail carrier whose love of the outdoors had been well known in this community beside the Pere Marquette River.

Leo Teholiz, art director of West Shore Community College, designed

the native stone structure after Mrs. Rigel approved the Mason County RC&D steering committee's proposal.—ROBERT J. AMSTERBURG, JR., *district conservationist, SCS, Scottville, Mich.*

Texas

Farmers adjust equipment and parallel terraces

Modern farmers in Texas using modern farming equipment on parallel terraces find it important to either adjust the equipment or shape the terraces to fit the equipment and keep them in good repair.

John McFarland, a cooperater with the Terry Soil and Water Conservation District near Brownfield, wanted to shape up his terraces so that he could farm them with six-row equipment. Using a motor grader he made his terraces wide enough so that he could put six rows on each side of the ridge. When he plows his field each year, the height of his terrace is maintained.

W. W. Emerson, a cooperater with the Lynn Soil and Water Conservation District near Tahoka, farms between his terraces and keeps the terraces in small grain. The small grain keeps them from eroding and wearing down from frequent cultivation. "Even if my terraces filled up and ran over the top, they would not break," Emerson says.

J. W. Gardenhire, farmer in Lynn and Dawson counties, finds it impractical to build his terraces big enough to fit his eight-row planter. To keep from tearing them down, he put hinges in his tool bar so that his equipment is flexible enough to conform to the shape of the terrace ridges.

These farmers recognize the need for repairing the end closures and internal blocks constructed as part of the terrace system. After heavy rains, they examine the blocks and build them back if damaged. The farmers put the terrace ridges up to at least 1 foot high to hold the expected runoff water.—BEN R. DAY, *agricultural engineer, SCS, Brownfield, Tex.* ♦

Entrance to park where fountain was built.



Foresters meet to "measure up"

"Measuring Up" will be the theme of the 1969 national convention of the Society of American Foresters being held in Miami Beach, Fla., October 13-16.

The theme "Measuring Up" is a direct challenge to the professional foresters of the Nation to perform their duties in a manner that will bring credit to their profession.

The topics to be presented in the general sessions are "The Forester—a Professional," . . . "His Growth," and . . . "His Responsibilities."

Preconvention trips include tour of woodlands operations of two industries in Jacksonville, Fla., and Mobile, Ala., and a visit to the Southeastern Forest Experiment Station. Post-convention tours include trips to Jamaica and Nassau.

Water Federation discusses water reuse and wastes

The Water Pollution Control Federation, hosted by the Texas Water Pollution Control Association, holds its 42d annual conference on October 5-10 in Dallas, Tex., and will reconvene in Monterrey, Mexico, October 12-14.

Some of the sessions include topics and discussions on water reuse, industrial wastes, wastewater rates and service charges, animal feedlot wastes, water-quality monitoring and data interpretation, river basin management, wastewater-treatment facility design, new process equipment developments, and thermal pollution.

Association tackles western water problems

Water-resource problems of major interest to the Western States will be the main part of the program

for the 38th annual meeting of the National Reclamation Association, Spokane, Wash., October 22-24.

Tours to Grand Coulee Dam or a North Idaho scenic trip are planned prior to commencement of the meeting.

Dates and places

October 1-4, National Conference of Editorial Writers, Indianapolis.

5-10, Water Pollution Control Federation, Dallas, Tex.

8-11, National Association of Biology Teachers, Philadelphia, Pa.

13-16, Society of American Foresters, Miami, Fla.

13-17, American Society of Civil Engineers, Chicago, Ill.

19-22, American Chamber of Commerce Executives, Detroit, Mich.

22-24, National Reclamation Association, Spokane, Wash.

21-25, Association of Engineering Geologists, San Francisco, Calif.

26-29, American Association of State Highway Officials, Philadelphia, Pa.

27-31, American Water Resources Association, San Antonio, Tex.

November

3-5, Western Seedmen's Association, Kansas City, Mo.

9-12, National Association of State Universities and Land Grant Colleges, Chicago, Ill.

9-12, National Forest Products Association, Boca Raton, Fla.

9-14, American Society of Agronomy, Detroit, Mich.

9-14, Soil Science Society of America, Detroit, Mich.

10-12, Geological Society of America, Atlantic City, N. J.

10-19, National Grange, Daytona Beach, Fla.

24-Dec. 1, General Assembly International Union for the Conservation of Nature, New Delhi, India. ♦

Idaho receives model tree farm

A model Tree Farm established at Farragut State Park, Idaho, for the recent 7th National Boy Scout Jamboree, has been donated by the American forest industry to the Idaho Department of Parks to become a permanent exhibit.

The gift was made by forest products companies which developed the model Tree Farm for use during the Jamboree to demonstrate sound forestry management practices and principles. ♦

Review



Even-Aged Silviculture for Upland Central Hardwoods. BY BENJAMIN A. ROACH AND SAMUEL F. GENGRICH. 1968. *USDA Agriculture Handbook 355*. 39 pp., illus. \$0.50.

For many years, we have watched the research in the even-aged management of upland hardwoods at the Vincent Furnace and Mead experimental forest in Ohio. The publication "Even-Aged Silviculture for Upland Central Hardwoods" is the published results of this and other experimental work. This is one of the major contributions to the management of central hardwoods since people began to be interested in managing this type of timber.

The seemingly obvious fact that the desired species of timber growing in the central hardwoods needed space and sunlight for desired growth was overlooked by foresters for many years. Even though examples could not be found, it was consistently argued that individual tree selection would result in a continued high-quality stand of the desired trees on all sites.

Clear cutting was a dirty word in forestry. But after years of demonstrating the "desirability" of such a practice, a few of the practicing foresters and research foresters began looking at the results of clear cutting made years ago to prove that it was a "bad" practice. Many of the observers were astounded at the results. On these demonstrations of "poor" management were the best of the young stands of thrifty growing and desirable trees. Obviously, something was wrong, and research began exploring the possibility of managing hardwood forest under the principles of even-aged silviculture.

The Soil Conservation Service field people in the Central Hardwood Region will find the published results of this hardwood research both interesting and familiar; per-

haps, interesting because it is familiar. The principles of silviculture and hardwood management outlined in this publication are the principles that they have been following for the past several years. In addition, the research findings are tied in with soils that should be as familiar to SCS men as their own backyard.

Of course, the authors being true research men have hedged a bit in true research fashion. They note that the research was carried out in a rather limited area and suggest that some caution should be used in following the principles outlined in areas more remote from the place of the research work. They also insist that additional research is needed. Be that as it may, we know that there is always a need for continued research in all facets of forest management, and we know that precise management details can be determined only with onsite examination of a specific area. We also know that the principles outlined by this publication are both sound and practical. And we believe that these principles have a very wide application beyond the Central Hardwood Region, and, perhaps, encompassing most of the major hardwood timber types in the Nation.—CARROW T. PROUT, JR., *chief forester, SCS, Washington, D. C.*

New publications

The Hired Farm Working Force of 1968. BY ROBERT C. McELROY. 1969. *USDA Econ. Res. Serv. Agr. Econ. Rpt. 164.* 30 pp., illus. Gives data on the size and composition of the 1968 hired farm working force and on the employment and cash earnings from farm and non-farm wage-work obtained during the year.

Man and Nature in the City. 1968. *U. S. Dept. of Interior, Bur. of Sport Fisheries and Wildlife.* 92 pp., illus. \$1. Publication of 16 papers and discussions presented by specialists from colleges, universities, and federal, state, and private organizations at a symposium sponsored by the Bureau of Sport Fisheries and Wildlife. The seven topics discussed were on: "Human Needs and the Natural Environment," "Nature and the Urban Dweller," "Nature in Our Cities,"

"Meeting Urban Wildlife Needs," "Nature and the Ghetto Dweller," "The Natural World of the New City," and "Urban Youth and Natural Environments."

Minimum Design Standards for Community Water Supply Systems. 1968. *U. S. Dept. Housing and Urban Development FHA 4517.1.* 74 pp. Handbook presenting criteria for nationwide use of developers, builders, and consulting engineers in developing privately owned central water systems that will provide properties insured by Federal Housing Administration with water in adequate quantity, of acceptable quality and sufficient pressure.

Tree Diseases of Eastern Forests and Farm Woodlands. BY GEORGE H. HEP-
TING AND MARVIN E. FOWLER. 1969. *USDA Agr. Inf. Bul. 254.* 48 pp., illus. \$0.35. Presenting some of the information formerly used in Farmers' Bulletin 1887, "Reducing Losses From Tree Disease in Eastern Forests and Farm Woodlands," this publication gives information on important diseases of 24 major species.

The Life of the Forest. 1969. *St. Regis Paper Co. New York.* 15 pp., illus. Beautifully illustrated in color, the booklet explores the growth process of trees, their role in the forest world, how they can be utilized fully without waste, and how their quality can be improved. It also shows a few of the wonders in the forest community.

Flowers and Foliage Plants. Production and Sales in Selected States, 1956-68. 1969. *USDA Statistical Bulletin 442.* 35 pp. Contains all series of commercial floriculture estimates of the Crop Reporting Board based on annual reports from flower and foliage plant growers.

Outdoor Education on Your School Grounds. BY NORMAN F. MARSH. 1968. *The Resources Agency, Office of Conserv. Education, State of California. Sacramento, Calif.* 82 pp., illus. A manual for elementary and junior high school teachers for conducting effective learning programs on school grounds.

Changes in Farm Production and Efficiency, a Summary Report. 1969. *USDA Statistical Bulletin 233.* 17 pp. Presents major statistical series on farm production, production inputs, and efficiency for the 10 farm production regions.

Forest Taxation and the Preservation of Rural Values in New York. BY ELLIS T. WILLIAMS. 1969. *USDA, Forest Service, Agr. Econ. Rpt. 150.* 24 pp. \$0.30. Study conducted of the forest tax situation in New York; study could have broader application.

Soil surveys

Osceola County, Michigan. BY WESLEY METTERT. 1969. 139 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by Wesley Mettert, Sheldon Holcomb, Stephen Shetron, Carl Basil, Lloyd McKenzie, Eliahu Wurman, Yassoglu Nicolaas, Clyde Black, and Donald Franzmeier.

Salem County, New Jersey. BY VAN R. POWLEY. 1969. 86 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Albert D. Backer, L. E. Lindley, Van R. Powley, and Leonard Zabler.

Pike County, Pennsylvania. BY DAVID C. TAYLOR. 1969. 83 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by David C. Taylor, Percy Billings, Glen Fisher, and Gene Trapp.

Preble County, Ohio. BY NORBERT K. LERCH, PAUL E. DAVIS, LAWRENCE A. TORNES, ERNEST N. HAYHURST, AND NILES A. McLODA. 1969. 101 pp., illus.; maps 4 inches to the mile (1:15,840).

Collin County, Texas. BY ARTHUR HANSON AND FRANKIE F. WHEELER. 1969. 55 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by Dan A. Blackstock, Curtis H. Deaver, and Edward W. Pauls.

Delaware County, Ohio. BY FRANCISCO MATANZO, KENNETH L. STONE, JR., R. D. THOMPSON, AND KENNETH H. WENNER. 1969. 71 pp., illus.; maps 4 inches to the mile (1:15,840).

Clay County, Iowa. BY CHARLES S. FISHER. 1969. 102 pp., illus.; maps 4 inches to the mile (1:15,840).

RC&D Project to spur local economy

The 7-million-acre Sangre de Cristo Resource Conservation and Development Project in southern Colorado, involving Custer, Fremont, Huerfano, Las Animas, and Pueblo counties, is now eligible for special assistance from U. S. Department of Agriculture agencies.

Project sponsors—nine conservation districts, 12 towns and cities, and five county boards—have proposed projects that should lead to new industry, tourism, trade, and sustained employment to reverse the economic decline of past decades.

Resource conservation and development (RC&D) activities are carried out by local people with Soil Conservation Service assistance. ♦

Windbreaks and conservation

Many of us commonly associate windbreaks with the Great Plains. In the windswept expanses of the Great Plains, windbreaks have proved their economic, social, scenic, and environmental worth.

Windbreaks, too, are a part of the farmstead setting in many areas of the Corn Belt. They have, in fact, widespread and varied uses that materially improve the physical environment in all 50 states.

Windbreaks protect the muck soils of New York and Ohio—soils that are highly susceptible to wind erosion. In New Jersey, rows of trees stop damage to vegetable crops. Similar plantings keep the windblown sands from cutting cotton and soybeans in South Carolina.

In Florida, vegetable and citrus growers rely on fast-growing Australian-pine, while California growers of the same crops plant rows of sunflowers to supplement the protection afforded by the Eucalyptus windbreaks. In Alaska, hardy Matanuska farmers need and use windbreaks in carrying out their conservation plans, as do those on the Kona coast of Hawaii.

Feasibility of windbreaks and shelterbelts in the Plains country was demonstrated through the Shelterbelt Program and the Prairie States Forestry Project of the Forest Service in the 1930's. In 1942, SCS was assigned Department responsibility for windbreaks, a responsibility it still carries out through soil and water conservation districts and with state forestry departments.

Traditionally, foresters have assumed the leadership in assisting landowners set out and maintain windbreaks. But windbreaks are not just a forestry practice, nor are they a biology or an agronomy practice. Windbreaks are a conservation practice, one to which all of the disciplines have contributed.

Windbreaks are the conservation measure that probably affects as many facets of our environment as any single one we employ.

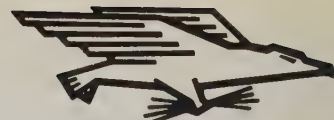
From an environmental standpoint, there is no other single practice in our conservation treatment package that:

- ... Affords protection to the urban resident as well as the farmer and rancher, and
- ... Protects homes and other buildings from wintry blasts and drifting snows and dust-laden air of summer, and
- ... Reduces the steady and often mentally exhausting gales to a gentle breeze around a farmstead, and
- ... Slows the winds down so they no longer pick up and transport particles of soil, and
- ... Reduces noise from highways, playgrounds, aircraft, and other sources, and
- ... Alters the "microclimate" of fields and the responses of plants to temperature, carbon dioxide, and water in a beneficial manner, and
- ... Can be designed to trap snow or spread it evenly over fields, and
- ... Provides livable outdoor shelters for livestock, and
- ... Offers homes, food and shelter for wild birds and animals, and in some instances food for man, and
- ... Creates so much beauty in the treeless plains, and in other areas where trees have yielded to the bulldozer, tractor, and harvester.

We face the challenge now, in both town and country planning, of stepping up our efforts in windbreak establishment and use, just as we do in conservation work related to woodland uses for recreation, watershed protection, wildlife, erosion control, and beautification.

The Service can provide a great deal of information and expertise on soils and their relation to tree species and growth; on tree selection and care, and on windbreak design and planting. Our soil surveys and plant materials centers continue to enlarge the body of scientific information we can share with land users, as do USDA research facilities. This year, let us make "Windbreaks for People" part of the enlarging "Trees for People" movement that recognizes trees serve man in many ways before they mature for harvest as wood products.

Kenneth E. Grant



If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

Operation Arbor Green charms suburbanites

A thousand trees ordered by suburbanites in an hour stirred up more excitement in Binghamton, Broome County, than did the planting of more than a million trees last spring by landowners in another rural county in New York.

Those thousand-an-hour trees bought from a commercial nursery and sold by the Broome County Soil and Water Conservation District weren't sold in one bundle, but singly, or in packages of three or seven trees—whatever number the buyer needed. The demand was so great that some 2,000 people called or queued up to buy 26,500 trees and plant them on at least a thousand small properties.

Sam Rizzi started it all. He's one of the new breed of conservation district directors, representing the nonfarm landowners and land-users in the Broome County District. He doesn't own a farm. He like trees, though.

"The State Conservation Department sells trees only in bundles of a thousand. My neighbors in the housing development need two, or maybe 20, trees for planting a steep bank, or a clump for wildlife cover, or just for beauty," said Rizzi.

So Sam persuaded the other directors that the Broome District should buy a thousand seedlings from a commercial nursery for resale. Sam agreed to handle the publicity for "Operation Arbor Green."



Willis Thompson (right), first customer, picks up his Norway spruce and white pine seedlings from Mrs. David Franta of Broome County ASCS office and Edward Henderson of the Broome County District (photo courtesy of Binghamton Press).

As soon as the story broke in the papers and was announced on the radio and TV, orders started coming in and didn't stop when the thousand trees were gone.

"What do we do now?" cried the two district clerks. The private nurseryman was contacted again. Yes, he'd be very happy to supply another 25,000 trees and so on.

The girls spent several days just answering telephone inquiries. People who couldn't get a call through stood in line outside the office door to order trees.

The girls figured they had more than 2,000 callers. Very few of these people had ever had any pre-

vious contact with the district, or any of the other agencies in the Broome County Farm and Home Center. They were glad to learn how the district directors working with commercial nurserymen could provide this much needed service.

Next year the district directors plan to increase the number of varieties of trees and add some wildlife shrubs. They hope this is just the beginning of many new ways the district can expand its program to reach more urban and suburban landowners and get more land treatment done.—HOWARD H. WILSON, JR., district conservationist, SCS, Binghamton, N. Y. ♦

35/4 November 1969

Two floods

Tennessee, Virginia

Soil information
for land use planning

Soil Conservation Service
U.S. Department of Agriculture

Soil Conservation

Devoted to the wise use of land and water resources

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CURRENT SERIAL RECORDS



Our meager beginnings at flood-prevention work were tested critically by two once-in-a-century-plus rains that struck sections of Appalachia last summer.

In the midst of a three-county area in Tennessee in June one small watershed with a nearly complete PL-566 Project withstood an 8-inch rain with minor damage. Across the ridge, a similar watershed counted two lives and \$2.3 million lost.

Before the waters receded, SCS watershed specialists were on the ground to document the event, with Audio-Visual Chief Joe Larson there to help record the story (p. 75).

A couple of months later, Hurricane Camille deluged the headwaters of the Potomac and James rivers. Information Specialist Bernie Roth and Virginia Watersheds Leader John Abernathy toured the area to give us an appraisal (p. 78) of our flood-prevention work in the Potomac Basin.

Urban hydrology

It doesn't take a hurricane to make a flood in paved and graded urban areas, as many communities are learning to their sorrow. Soil and engineering knowledge are combined in our center-spread article (p. 83) to explain what happens to the hydrologic regime when land is converted from farm to urban uses.

Planning maps

SCS offers a significant new service to land use planners in the intermediate-scale national soil map (p. 80) now being started with coverage of the urbanizing east coast.

COVER: The solid pattern of impervious housetops, streets, and graded yards contrasts strikingly with the absorptive forest cover replaced by a residential development in New Jersey.



Soil **Conservation**

Devoted to the wise use of land and water resources

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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A tragic contrast . . .

Two small watersheds in a Tennessee storm

Early the morning of June 23 north central Tennessee was struck by a record thunderstorm which dumped 8 to 9 inches of rain on the area in 6 hours.

The intensive rains rushed down the steep Cumberland Mountain foothills and turned small placid tributaries in Macon, Clay, and Jackson counties into raging flood threats.

Hard hit were two adjoining watersheds—Salt Lick Creek and Jennings Creek.

In the unprotected watershed of Salt Lick Creek the flood threat became a tragic reality—two lives lost, \$2.3 million damage to the community of Red Boiling Springs alone, plus hundreds of thousands of dollars damage to roads, bridges, and cropland throughout the rest of the watershed.

Jennings Creek watershed resi-

dents, protected by a virtually completed watershed project, suffered an estimated \$200,000 in damages but escaped more than \$1 million in damages due to the flood-retarding dams that had been built under the Public Law 566 small watershed program.

The two watersheds—with similar characteristics—received approximately the same amount of rain over the same period. The only difference was watershed protection, thus providing a convincing example of the effectiveness of the small watershed program.

The 10 earthen dams in the Jennings Creek Watershed Project kept an estimated 5,000 acre-feet of water—6.8 million tons—from inundating the valley. Water cascaded over the emergency spillways of eight of the dams for up to 9 hours after the rains stopped. Yet damage

A Red Boiling Springs home, swept off its foundation by floodwaters, finally came to rest against filling station pumps.



to the structures was slight. During this single storm the watershed dams prevented enough damage to pay nearly one-third of the project's total cost.

Back in 1946 a less intense storm dumped 6 inches of rain in 24 hours on the 46,000-acre watershed. The resulting flood took the lives of six people, three of whom lived in the little community of North Springs. Damage to crops, buildings, roads, bridges, and livestock in the watershed was very extensive.

This year North Springs virtually escaped damage. Luster S. Cassetty, president of the Jennings Creek Watershed District and resident of North Springs, said, "If the dams above had not been built, we would have left our house and probably would not have been able to return. I think we would have lost the whole thing."

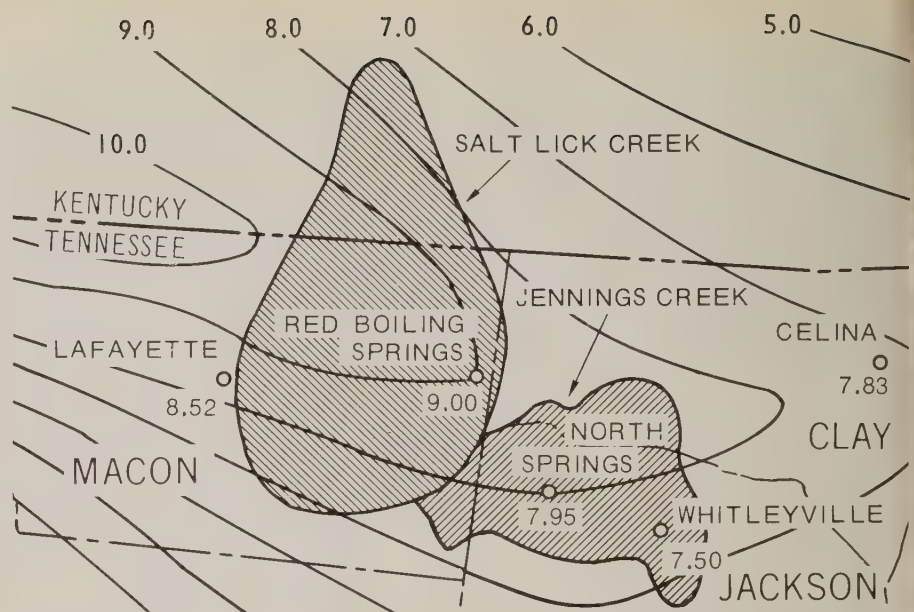
The change in the watershed came about when the soil conservation districts in the three counties and the Jennings Creek Watershed District applied for USDA assistance in establishing a watershed project under Public Law 566. The project became operational in 1958.

Ten of the 12 planned floodwater-retarding dams have been constructed—providing about 82 percent protection to the watershed. Three of the watershed lakes are stocked with fish and provide recreational opportunities for boating, swimming, and picnicking.

One lake and adjacent land were recently purchased by a local manufacturing plant for development as a recreational complex for use by its employees. Biology graduate students from Tennessee Technological University use other watershed lakes as outdoor classrooms. Students from Jackson County High School take field trips throughout the project area periodically.

But on the other side of the divide, the story is one of despair.

Red Boiling Springs, a small resort community, is nestled in the southeast portion of the 75,000-acre Salt Lick Creek watershed. On June



Above, isohyetal map of rainfall of June 23 in the environs of Salt Lick Creek and Jennings Creek watersheds. Below, buses, trucks, cars, 120 vehicles in all, were damaged during storm at Red Boiling Springs.



23 the flash flood causing \$2.3 million damage hit the community without warning and with unbelievable force. Swirling waters ripped up large chunks of asphalt pavement and tossed them around like pieces of styrofoam. At least 120 automobiles were turned over, smashed, and swept down stream. An estimated 35 homes and 15 business establishments were moved from their foundations.

The two young girls who drowned

were swept away from their mother as she attempted to lead them from their home to safety. The mother clung to a tree branch for 3 hours before she was rescued.

Personal property damage was extremely high. Knee deep mud settled on floors of stores and homes as the water receded.

Willis Knight, the young mayor of Red Boiling Springs, had but one thought when he viewed the damage. That was the small watershed proj-



Above, floodwaters never reached this home in Jennings Creek watershed, but without upstream dams they would have been 5 feet deep. Below, one of the 10 flood-prevention dams in the Jennings Creek watershed pictured before the storm.



ect that the community had been considering for the past 3 years.

"Had those dams been built," he said, "this tragedy wouldn't have happened."

The \$2.3 million suffered in Red Boiling Springs was nearly seven times the estimated cost of installing the proposed watershed protection project.

The unprotected watershed is vulnerable to storms of far less magnitude. Floodwater damage to agriculture is estimated to be \$54,500 annually. Although considered a moderate loss, the frequency and severity of the floods make it impossible to use the land to its full capabilities.

Nonagricultural damage to Red Boiling Springs amounts to \$6,000 yearly. Actual floods occur every 3 to 5 years.

An investigation report made on the watershed in 1967, under the Appalachian Regional Development Act, showed that annual damages could be reduced by at least 70 percent if local people sponsored a small watershed project under Public Law 566.

Community leaders were interested in the project. In addition to flood protection, two of the proposed reservoirs could be developed for municipal and industrial water and recreation uses.

These two measures alone could have added an estimated \$86,000 to the community's economy and create an environment attractive to small industry.

But the watershed proposal was turned down because the community couldn't raise the \$97,000 needed as its share of the \$1 million project.

The tragic flood immediately brought renewed interest in the watershed project. During a special session a week after the storm, Red Boiling Springs' city council unanimously passed a resolution urging USDA's Soil Conservation Service to promptly put into effect that portion of the Salt Lick Creek Watershed Project that would protect the community from future floods.

The resolution stated that the community would be bound and obligated to do everything within its power and financial ability to assist in the construction of the project.

Mayor Knight is convinced that if the four flood-retarding dams had been built upstream from the city, damages would have been drastically reduced. SCS watershed specialists agree. In reviewing the watershed plans, they say the proposed structures would have reduced damages from this particular flood by about 90 percent. ♦

Soil painting creates interest in surveys

Dock J. Polone of Claremore, Okla., has earned the reputation of being a mud dauber, not because he is a soil scientist but because of his hobby of making paintings and artistic displays from soil samples.

The many bright-colored soils found in northeast Oklahoma inspired Polone to use them for painting. He has made colorful, educational displays to create interest in soil surveys.

Polone says that soils can tell their own story and proves it by using their many colors to paint colored general soil maps, conservation scenes, and portraits of people and animals. These sculptured paintings are in semi-relief giving a third dimension. For painting materials he uses finely pulverized soils applied to board with an emulsion of one-half water and one-half glue, which becomes rock-hard upon drying.

A career soil scientist for 34 years, Polone has done all of his soil mapping in eastern Oklahoma. He estimates he has mapped 4,400,000 acres of eastern Oklahoma soils.

Polone relies heavily on his Cherokee Indian ancestry to provide the talent needed for his hobby. —MYRON A. HURD, *district conservationist, SCS, Claremore, Okla.* ♦

Camille and the Potomac

Hurricane whiplash draws attention to basin-wide flood-protection program

The recent whiplash of Hurricane Camille across Blue Ridge country in Virginia was a reminder that protection of Potomac River Basin resources is still unfinished business.

Water and rock cascaded down from the upper reaches of the Potomac and neighboring James River Basins last August 20 to take hundreds of lives and cause more than \$150 million in property damage. Dozens of people are still missing and damage to property and crops is still being assessed.

27 inches of rain

In the worst-hit Nelson County and vicinity on the east slope of the Ridge, in the James Basin, virtually nothing except earlier warnings might have diminished deaths and destruction. Here incredible 27-inch rains and landslides caused 200 fatalities.

One reporter wrote, "Rivers and streams have changed their courses. Portions of the brand new (3 weeks old) dual lane section of U.S. Route 29 simply no longer exist. A rock slide at Lowesville covers at least 40 acres . . . and all of this the results of one night's rain!"

Waynesboro, west of the Ridge, had some advantage in 12 flood-water-retarding dams installed in the past dozen years in the South River subwatershed, part of a comprehensive program for the far-flung Potomac Valley. Camille's inch-per-hour torrents of rain did run over emergency outlets of several structures and down other valleys, to make a \$2-million sweep through town. But the dams held some 2 billion gallons of floodwater out of

urban areas, averting much higher damages and possible loss of lives.

A warning to campers

One of the dams on a South River tributary a few miles upridge from the community was credited with saving 100 campers from injury or death. They were attempting to weather the storm at Sherando Lake recreation area high in the George Washington National Forest. A warning roar of water gushing over the emergency spillway above the campsite at 2 a.m. sent them scattering for higher ground. Except for a good soaking and some damaged or lost equipment at 10 or 12 campsites, they decamped unscathed the following day. Without the dam, a flash flood might have swept many campers into the lake.

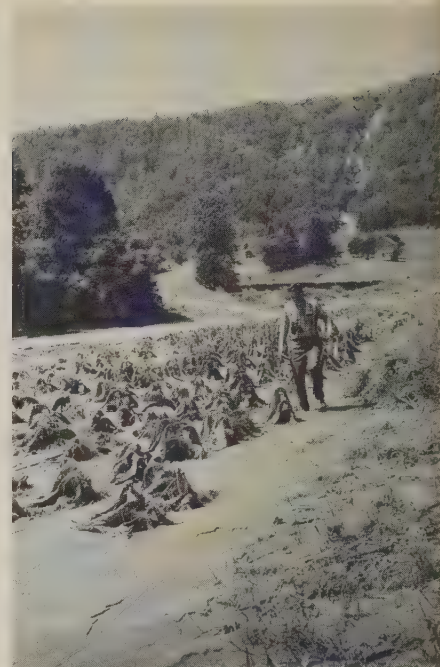
Along the little waters

Of the Waynesboro area episodes, Mayor Benjamin Cooper voiced the feeling of many, including hardest hit residents and businessmen: "It could have been much worse, as it was in many places nearby."

The South River work that helped Waynesboro weather the storm is part of a master program that is only begun in the vast four-state Potomac River Basin.

Along the mainstream and larger tributaries, major works of improvement have reached various stages of design and consideration. Higher in the Appalachian uplands of Virginia and West Virginia, there is visible action of a different sort. The locale consists of little creeks, runs, forks, and rills that feed "the Nation's River."

Here, subwatershed projects that



This tobacco crop and many others will never be harvested.

combine structures with coordinated land treatment are modest individually. But collectively, they are designed to relieve water troubles far upstream where floods begin.

Action started in the late 1930's when the Congress authorized the Department of Agriculture to lend special skills to the locality. Co-operating soil conservation districts—the Lord Fairfax and Shenandoah districts in Virginia and the Eastern Panhandle and Potomac Valley districts in West Virginia—launched a massive program to treat the land. For 25 years, the organized land-owners have bettered their pastures, contoured their crop fields, reforested hillsides, installed woodland fire-controls, and corrected grazing abuses. These and similar measures now protect thousands of acres. Building of 8,000 farm ponds has multiplied local water sources.

In the mid-1950's, districts and the USDA adopted the broader watershed program, including flood-retarding structures on smaller tributaries.

The Soil Conservation Service teamed with the U.S. Army Corps



Peaceful Lake Sherando, below the watershed dam that gave campers time to get out of the floodwater's path, is a striking contrast to the many flood-littered communities in Appalachian Virginia.

of Engineers in checking potential sites. Their investigations were aided by the districts' landowner-supervisors.

Upstream damsites

In all, they identified 527 acceptable Upper Potomac locations in a comprehensive approach for the basin. Upstream dams are intended to complement major works of flood control and water development planned for downstream areas. Of about 240 sites proposed for Virginia, some 150 are in the Shenandoah Valley area.

Construction is underway along picturesque reaches of the North and South rivers in Virginia; and on South Fork, Patterson Creek, and

many other streams of West Virginia.

Masses of earth and rock three times the volume of the Great Pyramid of Egypt have been moved, and 67 flood-retarding dams are completed.

Each has increased the safety of lives and property downstream. Bottom-land farmers, suburbanites, and a growing number of high-cost industrial complexes have felt their benefits. Together, the dams can store more than 9 billion gallons of floodwater to take the sting out of intense storms and snowmelt.

Recent structures have been built to add municipal and agricultural water storage, fish and wildlife, and public recreation benefits to their basic job of flood prevention.

One dam in each state already supplies water as well as protection to its neighboring communities. A dam on the Upper North River in Virginia stores 616 acre-feet for the city of Staunton, and a site on Mills Creek holds 307 acre-feet for suburban Waynesboro. The largest subwatershed structure to date, 100-foot-high Site 14 in New Creek-White's Run watershed, contains water equivalent to a 2-year supply for the city of Keyser, W. Va., and Site 46 on Patterson Creek provides 184 acre-feet for Ft. Ashby.

Water supply a byproduct

Several sites along the fringes of George Washington National Forest have been fully developed for organized camping, boating, swimming, picnicking, and hiking. Many others afford some incidental recreation.

The subwatershed program aims to reduce the rate of upstream flood damages by as much as 60 percent. Basic water-saving measures established by local farmers already have carried them safely through periodic drought. Widespread watershed land treatment—at least 80 percent of it paid out of individual landowners' pockets—tends to offset erosion problems of feverish construction in the metropolitan areas.

Distribution and timing of construction of Potomac upstream structures become increasingly critical. Operations will undoubtedly need to be adjusted to pressures of population as well as phenomena like Hurricane Camille.

That the soil conservation districts and other local interests can cope with such dynamics seems clear. The matter of time—completion date is set for the year 2010—concerns community leaders and agencies alike.

Massive erosion, flooding, and sedimentation continue to plague the District of Columbia area in the lower basin. Upstream in Virginia, the events of the night of August 20, 1969, will haunt the mountain hollows for years to come. ♦

A new soil map of the United States

By Arnold C. Orvedal

Assistant director, soil survey interpretations, SCS, Washington, D.C.

A new national soil map designed specifically to meet the needs of regional land use planners and others concerned with multicounty areas is being produced by the Soil Conservation Service.

The first two sheets, nearing completion, cover the rapidly urbanizing Northeastern States where the demand for soil information to guide land use changes is urgent.

The scale, 1:1,000,000 or about 16 miles to the inch, is intermediate between that of detailed soil surveys currently being published by SCS and the small-scale soil map in the *National Atlas* to be published by the U.S. Geological Survey.

A familiar scale

The resulting maps are comparable in scale to the familiar road maps available in filling stations. The 48 mainland states will be covered on 13 sheets 38 by 48 inches in size.

This is one of the most widely used standard map scales. The World Aeronautical Charts and sheets of the International (geo-

graphic) Map of the World are at this scale. Increasingly, maps on other subjects are appearing at this same scale—an obvious convenience to planners and technicians who must consider and integrate information on several subjects for the same area.

One of the important federal series of state base maps is at the scale of 1:1,000,000. A state map at this scale is sufficiently large to show considerable information but not too large for convenient use at a desk. Single sheets accommodate between 50,000 and 200,000 square miles, making this scale one of the best for regional planning.

The smallest feasible delineation represents about 15 square miles of countryside, but most delineations are larger. This minimum on-the-ground area means that the map represents considerable generalization of the kinds of soil and their distribution, which is necessary for it to convey as much information as possible without being a jungle of tiny delineations and symbols.

The map is designed to be the

best possible record of our soil resources at the 1:1,000,000 scale. It is intended to serve as a basic technical reference rather than a map for general popular use. It can be used to make other maps showing regional interpretations and supplementary maps designed to meet the specific needs of individual studies.

A basic reference

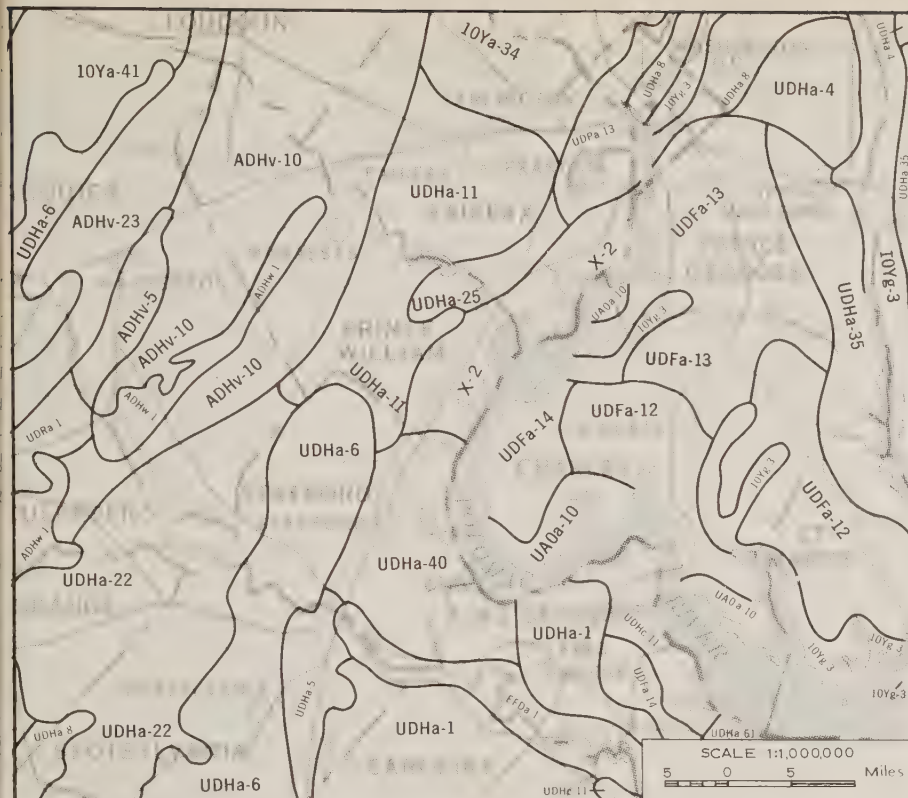
The detail of the classification used on a map is as important as the scale in determining its practicality and usefulness. Soil subgroups (which are just one step above families in the hierarchy of categories in the soil classification system) were chosen as the basic components of the soil associations for the new national map. Subgroups carry enough information that important interpretations can be made. At this level, the number of map units (associations) is between 150 and 200 on a single sheet and between 1,500 and 2,000 for the entire United States.

Although phases of series provide

Legend and Description of Soil Associations Shown on General Soil Map
(Scale 1:1,000,000)

Map symbol	Legend Map unit name	Extent (square miles)	Physiographic setting	Component soils Name	Percent	Depth to bedrock (feet)	Shrink-swell potential	Flood hazard
EFDa-1	Typic Udifluvents and Fluventic Haplaquepts, loamy, level	(1)	Floodplains, wet in part, underlain by sediments containing a large component from gneisses, schists, and other rocks containing mica	Typic Udifluvents, loamy, level Fluventic Haplaquepts, loamy, level Other soils	70 20 10	>10 >10	Low Moderate	Severe Severe
IOYa-34	Typic Dystrochrepts and Typic Hapludults, loamy, sloping	(1)	Moderately dissected uplands underlain by gneiss and schist—Piedmont	Typic Dystrochrepts, loamy, sloping Typic Hapludults, loamy, sloping Other soils	50 35 15	2-4 3-10	Low Low	Slight Slight
UDHa-22	Typic Hapludults, clayey, sloping, and Lithic Dystrochrepts, skeletal, moderately steep	(1)	Sloping uplands underlain by schists—Piedmont	Typic Hapludults, clayey, sloping Lithic Dystrochrepts, skeletal, moderately steep Other soils	50 30 20	>4 <1½	Moderate Low	Slight Slight

¹ Data not yet available.



A portion of the preliminary draft of a sheet of the new national soil map, showing Washington, D. C., in the upper right corner, is reproduced here at actual scale, 1:1,000,000. The soil boundaries and symbols are on a new base map for nationwide use being adapted by SCS from manuscript material provided by the U. S. Geological Survey.

information to those familiar with the soil classification system. Although others may not find them easy to understand, no acceptable substitute has been found for this terminology. The examples of the tables, however, have been prepared so that all who deal with soil resources will find the information meaningful. The tables illustrate the map unit symbols and names along with the kinds of descriptive and interpretive information proposed.

The soil map-unit symbols used in this draft fit into the system developed for technical, small-scale soil maps. The system's advantages compensate in part for the cumbersome length of the names and symbols.

Descriptive mapping

As mapping is extended, new units can be inserted in alphabetic-numerical order. Legend organization can be maintained because map units with the same principal components are kept together. Secondly, the symbols suggest the soil name. After a little practice, users can remember them more easily than if symbols and soil names were unrelated. (All symbols beginning with "U," for example, stand for Ultisols). Another advantage is that the system can be applied nationally.

The map is accompanied by a table describing some major fea-

the best information for interpretations, a national map in those terms would be unmanageably complex since the number of series in the United States approaches 9,000. Soil families, the next higher cate-

gory, was rejected for the same reason, plus the handicap of exceedingly long names.

The legend of the map makes use of scientific names of soils, because they convey a great deal of

**Selected Interpretations of Soil Associations Shown on General Soil Map
(Scale 1:1,000,000)**

Map symbol	Component soils	Tilled crops	Suitability for—			Foundations	Limitations for—	
			Pasture	Tree fruits	Timber and pulp wood		Shallow excavations	Septic tank filter fields
EFDa-1	Typic Udifluvents, loamy, level	Good	Good	Good	Good	Severe	Severe	Severe
	Fluventic Haplaquepts, loamy, level	Poor	Fair	—	Good	Severe	Severe	Severe
IOYa-34	Other soils							
	Typic Dystrachrepts, loamy, sloping	Fair	Fair	Fair	Fair	Moderate & severe	Moderate & severe	Severe
UDHa-22	Typic Hapludults, loamy, sloping	Good & fair	Good	Good	Good	Slight & moderate	Slight & moderate	Slight & moderate
	Other soils							
	Typic Hapludults, clayey, sloping	Good & fair	Good	Good	Good	Moderate	Moderate	Moderate
	Lithic Dystrachrepts, skeletal, moderately steep	—	Poor	Poor	Fair	Severe	Severe	Severe
	Other soils							

tures of each map-unit and its principal components. This information emphasizes features highly relevant to soil interpretations demanded today for homesite selection and other applications. Perhaps the most useful part of the table sets forth interpretations, such as the soil limitations for foundations, shallow excavations, and septic tank filter fields. Because the map shows basic soil information, additional interpretations can be made by those who are familiar with the soils as indicated by their scientific names.

Generally, the problem of ex-

pressing interpretations becomes more difficult as the scale of the map becomes smaller, because the map units become correspondingly less homogeneous. The table is adjusted for this shortcoming in two ways:

(1) Interpretations are given for the individual components of a map unit, rather than for the map unit as a whole. Such treatment is especially important if the components contrast highly, as in the case of UDHa-22 (see table).

(2) The number of rating classes is limited; e.g., slight, moderate, and severe. This means that each class

has a wide range; yet not so wide as to make the interpretations too ambiguous for many uses. The interpretation range for some components may need to be indicated by two terms (e.g., "slight and moderate") but usually one term will suffice. The rating terms must be defined as precisely as possible.

The new map and tables will provide a vast amount of practical information to resource planners who must help decide on how our land is to be used around our growing cities and all the countryside between. ♦

Officials speak out on sediment control

Steps that communities must take to deal effectively with the problem of sediment from expanding urban and suburban areas were pinpointed at the National Conference on Sediment Control in Washington, D.C., September 14-16.

Representatives of counties and conservation districts across the Nation joined with state and regional officials and Washington area conservationists to discuss the widely varying problems on sediment in their local areas.

The draft of a publication, "Community Action Guide for Sediment Control," was thoroughly reviewed by participants in workshop sessions. The resulting draft will be published by the National Association of Counties to help local officials deal with their sediment problems.

U.S. Senator Jennings Randolph of West Virginia sounded the conference keynote, naming sediment as "the world's greatest pollutant."

Senator Randolph said that damage caused by sediment is reflected not only in the loss of storage capacity for water supply, flood control, power generation, navigation, and regulation of streamflow for water-quality control, but also in its impact on these facilities for recreation.

"Man now has the power to con-

trol many of the elements of Nature," Senator Randolph pointed out. "He can destroy the soil, render air and water unusable through pollution, kill every form of life—himself included."

Some quotes from other speakers:

CARL L. KLEIN, *assistant secretary of Interior for water quality and research*:

As a nutrient carrier, sediment promotes algal growths which degrade water quality and accelerate the aging process of lakes and reservoirs. Dredging requirements and loss of reservoir storage space caused by sedimentation costs this Nation about \$225 million annually, and this does not include the loss of topsoil, the severe degradation of water quality, or the damaging effects of sediment pollution on fish and wildlife.

NORMAN A. BERG, *associate administrator, Soil Conservation Service*:

We haven't finished the sediment control job on farm or forest or rangeland by any means. But sediment in suburbia is an increasingly challenging and difficult frontier of conservation.

The modern shopping center using 25 acres of land covers 19 acres with rooftop, blacktop, or concrete, including space for parking, access roads and streets, and curbing. The ability of the remaining 6 acres to absorb water is usually cut way down because of grading, shaping, and other construction operations. A similar situation prevails in a new industrial area, where most of the workers commute by automobile and where modern, efficient materials-handling and processing equipment is used. This mass alteration of land is creating real problems in water control.

ROBERT E. BRENNAN, *former director of the Maryland Suburban Home Builders Association*:

It may take a local crisis before people become aware of the problem, but in any case regulations must be based on eco-

nomics as well as environmental quality. They can't be offered to builders on a take it or leave it basis.

LESTER HERR, *chief, Hydraulics Branch, Bureau of Public Roads, U. S. Department of Transportation*:

Fitting roads to existing landscapes reduces the number of cuts and fills as well as the cost of erosion control and longterm maintenance. Highway planners, designers, construction foremen, and maintenance men need to communicate and cooperate more.

Good intentions don't get the job done. It takes manpower to check on the advisability and progress of conservation measures before, during, and after highway construction.

Concrete should be a last resort in dealing with roadside drainage ditch problems.

ALLEN CYWIN, *director, Division of Applied Science and Technology, Federal Water Pollution and Control Administration*:

Utilization of existing techniques and development of new techniques for sediment control that are tailored specifically for use in urban and urbanizing areas are musts if adequate control of sediment problems is to be achieved . . .

A. R. ROBINSON, *research hydraulic engineer and director, USDA Sedimentation Laboratory, Oxford, Miss.*:

Many of the methods used to control sediment on agricultural lands are directly applicable to control of urban sediment, and still others are applicable with some modification. Urbanization usually means that large areas of land are stripped bare and less permeable subsoil is exposed, in many instances for months or even years. In this condition the erodibility of the soil is usually increased many times.

It is important to develop criteria for reformation of drainage systems where the natural system has been altered. Improved bank and surface stabilization methods are needed. After stabilization, new technology is needed to deal with the hydraulic characteristics of the required drainage system. ♦

What urban building does to soil and water

By Charles E. Kellogg and H. C. Enderlin

Deputy administrator for Soil Survey and assistant director of Engineering Division, SCS, Washington, D. C.

The process of reshaping land for urban uses alters soils in many ways, often with drastic effects on drainage, runoff, and stream-flow.

With people and industries moving into the country in ever greater numbers, it is not surprising that some developments have difficulties with soil and water problems.

All too often we hear—too late—of a house that cracked up because it was built on a soil that would slide and buckle under the weight; of a local sewage system swamped by poor drainage; of a little stream converted into a raging torrent during heavy rains.

The tragedy is that most of these failures were unnecessary, had the builder only made use of soil information that was available or been aware of the changes urbanization often makes in local soils. The fact is that we have much land in the United States well suited to housing and

industrial development, and that the limitations of the remainder can be identified and the problems anticipated.

New buildings and streets change the old relationships between soils and plant covers. Soils that were well drained under crops or native plants may become poorly drained, and even unstable, when a high percentage of the surface is overlain with houses and pavements. The remaining uncovered portions cannot take in all the extra water, so they become seasonally wet. Because of the greatly increased runoff, small streams may leap over their banks when heavy rains come.

Slopes are modified by making cuts and fills, changing not only their steepness but also the physical properties of the soils themselves. The new surface may be far less pervious than the original, either because plastic clay from lower layers in the soil has been added as fill or an



Water that falls on the roof now spills onto the garden (above), further taxing the soil's capacity to absorb rainfall. Because the house is built on a poorly drained soil (left), the septic tank filter field cannot operate and effluent comes to the surface.





original porous surface soil has been removed.

Results from gaging streams in watersheds before and after urban development, reported in U.S. Geological Survey Circular 554 by Luna B. Leopold in 1968, show that peak discharges of runoff more than double when 80 percent of the soil surface is made impervious and may increase 75 percent when half the area is affected. These peak discharges are increased further when paved storm drains are used for rapid disposal of runoff water. Urban watersheds with 80 percent of the area covered or graded and all of it served by storm drains, have had their peak discharges increased six times over the original rates.

Soil erosion and sedimentation increase at comparable rates with those of runoff as watersheds undergo urban development. Damages are most acute during construction of buildings and roads within the watershed. Intense rains on bare slopes and spoilbanks, with drains and waterways still unpaved, produce maximum runoff. Under such conditions, rates of sedimentation may increase 100 times; e.g., a watershed that produces 1,000 tons of sediment per square mile under farming or natural cover may produce 100,000 tons per square mile while under construction—unless, of course, measures for runoff and erosion control have been applied.

Covering large parts of the soil surface may produce other serious hazards to the community. Increased wetness in some soils leads to slips

that break foundations and roadways. If individual home sewage-disposal systems become swamped, the sewage effluent is likely to appear at the surface near the site or lower down the slope. And local runoff can increase enough to flood soils not previously subject to flooding.

Under gradual development some of these events do not happen im-

This shopping center completely waterproofs 400 acres of former farmland.

Seasonally wet soils promise a nightmare rather than a dream for future home-owners.

Buildings, roadways, and parking lots direct practically all rainfall into storm sewers.



mediately. In many communities, housing on well-drained soils immediately above the natural drainage way is safe until homes are built later at a higher level. When these soils become wet, increased runoff causes excess water to spill out on the older homes below them. If the new homes have individual sewage systems, the older homes may have their gardens contaminated.

Where winters are severe, in silty

fine sandy soils, growing ice crystals fed by capillary upward movement of water may add to the instability of the soils and the structures on them.

We lack reliable estimates of the economic losses and dissatisfaction of homeowners and businessmen that result from failure to understand the hydrologic effects of construction and how to protect the land against them. Yet, from the

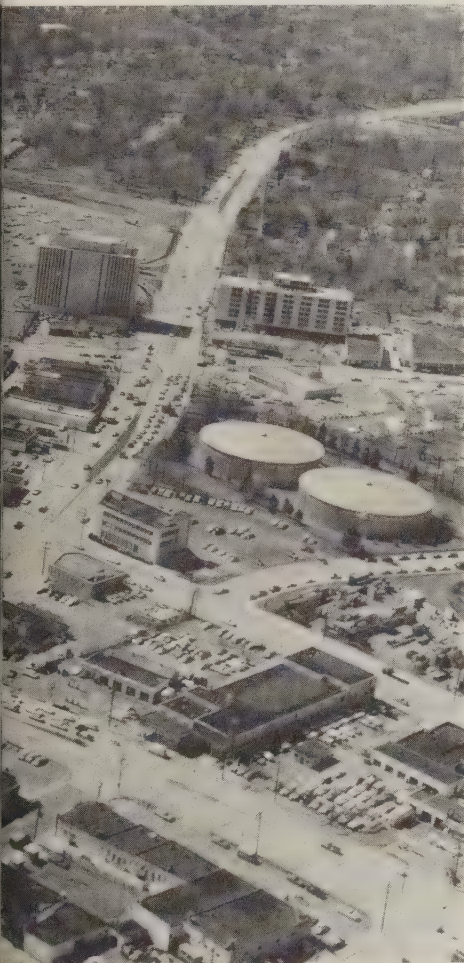
experiences of people in the Soil Conservation Service consulted after such damages occur, we know that the annual loss is very large.

Obviously, both engineers and soil scientists must understand the principles involved. Hydrologic interpretations of soils used in forests and open fields may not apply where drastic changes have been made in soil use. Soil scientists, engineers, and plant scientists have unique opportunities to cooperate in evaluating the hydrologic effects that soil-use changes have on a watershed.

Engineers predict storm runoff in two ways:

(1) By making frequency studies of observed discharges from past runoff events and projecting future ones from the historical record. Such predictions are valid only so long as the watershed characteristics that prevailed when the past events occurred remained unaltered.

(2) By relating amounts of runoff for specific areas to amounts of rainfall. This method is used most commonly because data on rainfall



Increased surface runoff adds to ponding of a naturally wet site.



are more abundant than those on runoff.

Hydrologists predict runoff from rainfall by establishing the percentage of rainfall that is taken in by the soils and the percentage that runs off under specified conditions. The amount absorbed is a function of the soil characteristics, including slope, and the plant cover. The soil characteristics can be interpreted from the soil survey. They are expressed in a hydrologic grouping of kinds of soil.

This "synthetic hydrology" is used increasingly by engineers as more data become available through laboratory examination of the basic properties of named soils. Such knowledge helps avoid unexpected problems of flooding and sedimentation.

Several communities have proved that with good knowledge of the local kinds of soil, and their relationships to the local rainfall, runoff can be controlled. Urban development can be planned so that erosion and sedimentation are minimized during the construction period. This means holding sediment production within a range of 2,500 to 3,500 tons per square mile and having no buildings flooded during the heaviest rain of a 100-year frequency. In strictly rural areas where investments are low, designs can be made for floods of more frequent occurrence.

Urbanizing communities also need to give attention to the need for storing water to insure supplies for industrial and domestic use, including supplies for watering plants and cleaning streets. Traditional ground-water supplies cannot be depended on when rural areas are built up. Many of the permeable soil areas that contributed to ground-water recharge become paved or covered with buildings, cutting off or reducing the source of water in wells.

In several urban areas over the country SCS is assisting local officials in selecting suitable kinds of soil for roads and structures and in evaluating the hydrologic effects of suggested developments. Soil con-

servationists and specialists can suggest protective measures against excessive runoff, sedimentation, and property losses. SCS has worked with counties, cities, and towns in urbanizing communities around Newark, N. J.; Boston, Mass.; Atlanta, Ga.; Washington, D.C.; Chicago, Ill.; San Antonio, Tex.; San Diego, Calif.; southwestern Wisconsin; several communities in

Michigan; and also many others.

These efforts have demonstrated that damages from erosion, flooding, and unstable soils, or serious deficiencies of water during droughts, can be anticipated. With an understanding of the relations between soils and water under changed conditions resulting from construction, appropriate plans for development can be made. ♦

Trace element studies link animal ailments with soils

By Joe Kubota

Research soil scientist, SCS, Ithaca, N. Y.

Studies of food-chain relationships continue to show that trace elements play significant roles in the health and growth of plants, animals, and humans.

The search for these relationships by nutrition and soil scientists at the U.S. Plant, Soil, and Nutrition Laboratory in Ithaca, N.Y., is leading beyond such familiar elements as cobalt and molybdenum to lesser known ones like cadmium and chromium.

Soil Conservation Service soil scientists are members of the research team at the Ithaca laboratory of the Agricultural Research Service. In addition to their work in the laboratory, they help to relate the findings to specific geographic areas through soil surveys that show where specific kinds of soils occur.

Changing emphasis

For several years, the veterinarians and plant and soil scientists have been studying the positive and negative effects of naturally occurring concentrations of cobalt, molybdenum, and selenium. Some well-known livestock "diseases" have been identified with excesses or shortages of these elements in their feed, and areas of problem soils have been mapped (see *Soil Conservation*, November 1965).

Cadmium and chromium are now

receiving considerable attention as researchers try to determine how much of each gets into human food from the soil by way of plants.

Cadmium has been shown to be associated with hypertension in people residing in different parts of the country; it has also been blamed for reduced life span of experimental rats. A higher incidence of hypertension has been attributed to cadmium in polluted air, but little is known of its importance in soil-plant-animal chains.

Although most people think of chromium in connection with automobile trim, this metal is an important part of animal and human metabolism. It is now known to be an essential component of a "glucose tolerance factor" that animals normally require. Chromium also has been shown to help some patients with abnormal glucose metabolism who are in a diabetic-like state.

SCS soil scientists have helped others make effective use of maps prepared to show areas of trace-element concentration. Relationships among soils outlined in classification schemes provide a basis for selection of soil and sampling sites. Soils that have similar effects on the production of deficient or toxic plants are grouped together. Their distribution outlines problem areas where feed and forage may be harm-

ful or less nutritious for livestock.

Selenium provides a striking example of soil-related toxicity and deficiency symptoms in grazing animals. "Blind staggers," "alkali disease," and "dish-rag heart" describe toxic effects that have dominated biological interest in this element for many years. "White muscle disease" and other equally descriptive terms have been used to label selenium-deficiency symptoms. Both conditions are of major economic importance to stockmen in the United States.

A level of about 0.06 p.p.m. or more of selenium in forage plants is presently considered necessary for most grazing animals. If the ration contains more than 4 p.p.m. of selenium, some toxic effects may develop.

Although an animal's selenium requirement may be lower if the ration is high in vitamin E, this vitamin does not completely substitute for the element. There is strong evidence that selenium is an essential element for animals; but a selenium requirement for plants has not yet been established.

Areas in the United States where selenium is deficient in feed and forage crops have been identified. The distribution of low selenium shows good agreement with the reported incidence of white muscle disease.

White muscle disease is largely absent in the Great Plains States where soils with calcareous subsoils of high-selenium availability predominate.

Levels of selenium in milk and human blood show a geographic distribution pattern similar to that of selenium in forage plants. The role of selenium in human metabolism is not known; but since so many different animals are known to require this element, it seems likely that humans also need it. Today there is active interest and research underway in the medical profession. However, interregional shipments of human foodstuffs in the United States make it unlikely that people in this country would be subjected to selenium-deficient diets.

More on molybdenum

Like selenium, molybdenum and cobalt have been analyzed and related to various physiological expressions of shortage, adequacy, and excess. Even though molybdenum interferes with copper utilization, it is essential for both plants and animals. Cases of molybdenum toxicity in animals are recognized as molybdenum-induced copper deficiency or simply molybdenosis. No exact critical ratio of molybdenum to copper can be specified, but molybdenosis can be expected when molybdenum concentrations in for-

age plants exceed 10 to 20 p.p.m. Molybdenum is more toxic in fresh forage plants than in dried feed.

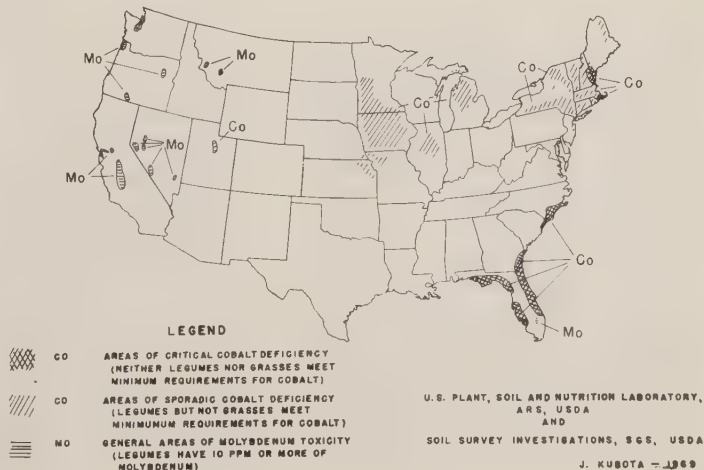
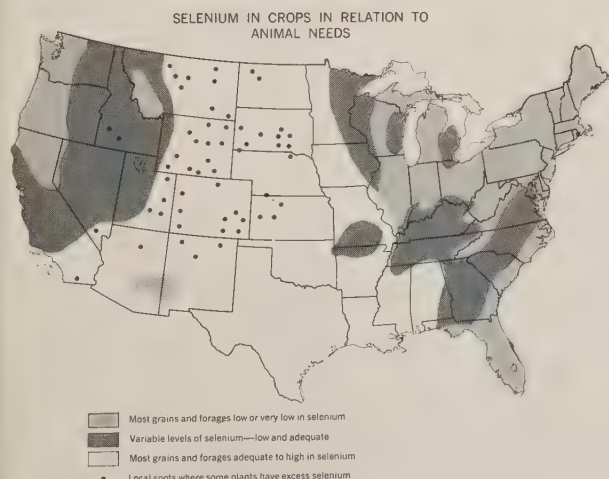
Molybdenum toxicity in grazing animals is primarily a problem in the Western United States. It is most often associated with neutral and alkaline soils on granitic alluvium of small streams. Since molybdenum is not readily available to plants on acid soils, they generally do not evoke symptoms.

Supplementary copper in salt or feed mixtures and subcutaneous injection of copper compounds are used to prevent molybdenosis. Copper fertilization of soils does not significantly increase concentrations in forage plants and is not a practical method of prevention.

Nutritional problems due to excess molybdenum are better known in this country than are problems due to excess copper. Cases of natural copper toxicities are rare here. In Australia, molybdenum is used to treat copper toxicity when it occurs in animals.

The distribution of high-molybdenum soil areas may be important to humans if observations relating molybdenum to good teeth can be substantiated in this country. It has been shown in New Zealand, England, and Hungary that children born and raised in areas of high molybdenum have better teeth (fewer decayed, missing, and filled)

Problem areas in animal nutrition due to lack or excess of trace elements in the soil: selenium (left), cobalt and molybdenum (right).



than do children of comparable ages in low molybdenum areas.

Cobalt deficiency is a problem where forage plants lack enough to meet the needs of grazing animals. Ruminants require cobalt for vitamin B₁₂ synthesis. The B₁₂ produced in the rumen moves on in milk and meat to nonruminants and man.

Unlike animals, common plants do not have a specific cobalt requirement. But nodular bacteria of leguminous plants require very small amounts of this trace element to fix atmospheric nitrogen in soils.

Broad areas where legumes and grasses are low in cobalt occur primarily in the Eastern United States. In these areas, neither legumes nor grasses provide enough cobalt (0.07 p.p.m.) to meet animal requirements. In other parts of the United States, animals receiving substantial amounts of legumes are not subject to cobalt deficiency symptoms known to early settlers as "Chocorua's curse," "albany ail," and "neck ail."

Cobalt deficiency is primarily associated with Spodosols. In New Hampshire and southwestern Maine, Haplorthods formed in glacial drift derived from White Mountain granites inherited too little cobalt to maintain the cobalt levels in common forage plants. Similarly, the Humaquods inherited very small amounts of cobalt in the sandy Coastal Plain deposits. The Humaquods have the lowest amount of total cobalt (about 1 p.p.m.) of any soils in this country.

Grasses and feed grains rarely contain sufficient cobalt for cattle and sheep. Animals fed with rations that do not contain forage legumes must receive cobalt supplements in nearly all parts of the United States.

Cobalt supplements in salt or mixed feeds are commonly used to correct cobalt deficiency in cattle and sheep. Fertilization of the soil with cobalt is also used in some areas of the United States. In Australia, pellets containing cobalt are put into the rumen. ♦

Speedy soil survey meets needs of Long Island county

By Austin L. Patrick, Jr.

Area conservationist, SCS, Albany, N. Y.

New York's Long Island is shaped like a fish. It's head is composed of the New York City boroughs of Kings (Brooklyn to you) and Queens. Then comes Nassau County, small and urban. Most of its body, with its forked tail sticking away out into the Atlantic Ocean, is Suffolk County and, of course, the Suffolk County Soil and Water Conservation District. The county is best known for potatoes, ducks, and people.

Suffolk is an amalgam of agriculture, industry, and suburbia compounded by a very high population growth rate. Concerned about wise use as the land went from rural to urban, the Nassau-Suffolk Regional Planning Board in 1966 contracted with the Soil Conservation Service for a soil survey of 60 percent of Suffolk's 590,000 acres, the fieldwork to be completed by the end of 1969.

Immediate information

Land use was changing so fast, they said, that the information had to be available soon. To finance the accelerated project, including extra personnel, the planning board appropriated \$30,000 supplemented by \$60,000 from the Department of Housing and Urban Development.

The result is an unusually speedy soil survey utilizing SCS soil scientists from 10 states from Maine to Texas. Fieldwork progressed ahead of schedule so that by May 1969 the whole district was mapped. Additional local financing had made this possible after planning boards learned how useful the early soil information was to the development of the towns first mapped.

Leader of the soil survey party

was John W. Warner, Jr., the only soil scientist assigned to work with the Suffolk County District full-time and paid wholly from SCS funds. His responsibilities for training and supervision were a major concern.

Twenty-eight soil scientists worked on the project, each spending 5 weeks to 3 months on the job. The number at any one time during the various details ranged from one to 16. They were most likely to be available from their regular assignments in the early spring and late fall.

The pleasures of mapping

Warner conducted 1-week orientation sessions for team members. Since all were professional soil scientists, they needed only to become familiar with local soils.

Ray Marshall, New York state soil scientist for SCS, says that the quality of the work is excellent.

Last fall, Warner working with Thermon Sanders from Michigan and Alan Ford from Texas did some of their most enjoyable mapping—on the offshore islands. These included Gardiners Island, owned by one family since it was received as a King's Grant and now used primarily as a private hunting preserve; Plum Island, the USDA animal disease research center; and Fishers Island, a resort island closer to Connecticut than to New York.

Island mapping brought two unusual experiences. Once the team had to stay on a lonely island until dark, since the police boat which ferried them was busy during the daylight hours seeking an escaped bank robber. Another time 15-foot waves made a very rough trip in the 30-foot boat. Warner said, "I

began to wonder how New York could explain to Texas and Michigan that their soil scientists were lost at sea while on duty."

Facts at work

Soil scientists who volunteered for the Suffolk project say that for the most part they wanted to broaden their experience. One man from Vermont said the longer mapping season helped to prevent "cabin fever." Another said he worked alone most of the time, and the Long Island job enabled him to rub elbows with fellow soil scientists.

While publication of the soil survey is still in the future, the information is now being used by the Nassau-Suffolk Regional Planning Board. The town of Brookhaven let a contract to revise the land use section of its master plan, to be based on the survey. The town of Southold is making some land use and zoning laws based on results of soil interpretations.

Such is the demand for SCS assistance that a signed memorandum of understanding between one town and the Suffolk County District was delivered by police car to the district board during its June meeting. ♦

A new clover that lasts longer

By Thomas A. Bown

Plant materials specialist, SCS, Jackson, Miss.

A new clover may contribute \$300,000 to the economy of Arkansas, Louisiana, and Mississippi. A new late-maturing clover has been found to help bridge the forage gap between cool-season and warm-season plants.

Meechee arrowleaf clover, a re-seeding winter annual, was evaluated by the SCS plant materials center at Coffeeville, Miss., and jointly released in 1966 by the Soil

Conservation Service and the Mississippi Agricultural Experiment Station.

Meechee has been tested and found to be adapted to all of Arkansas, Louisiana, and Mississippi. It is a cold tolerant, high forage producing, reseeding winter annual that can be used to overseed warm-season grass pastures for spring forage production. The use of this clover can result in a resource that

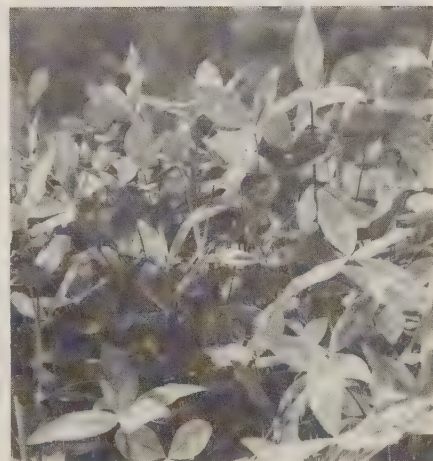
did not previously exist. Because it is late maturing, Meechee arrowleaf clover produces most of its forage after crimson clover has seeded out and before the warm-season forage plants have produced much growth.

Meechee clover begins its growth in late March or early April, depending on the location and the season. It can be grazed from mid-April to late May. The cattle should be removed to allow the plants to set a good seed crop, then the pasture can be grazed the rest of the summer.

The Meechee arrowleaf clover plantings in the three states had increased to about 2,500 acres by 1968. During the summer of 1968, approximately 80,000 pounds of Meechee seed was harvested from 350 acres.

Conservative estimates indicate that the forage from an acre of Meechee arrowleaf clover will produce 100 to 125 pounds of beef. If it is assumed that all of the 80,000 pounds of Meechee arrowleaf clover seed produced in 1968 were planted, there would be 8,000 acres in production in the spring of 1969. The projected value of the forage from these pastures, when converted to beef, would be \$240,000 to \$300,000. This is more than half the total cost of operating the Coffeeville Plant Materials Center from its beginning in 1961. ♦

Meechee arrowleaf clover in full bloom (left) and earlier in the season (right) shows its high-producing capability.



Irrigation ditch saves soil, water

A consolidated irrigation ditch in the Gallatin Valley Soil Conservation District, Mont., reduces sedimentation in the Gallatin River while it provides dependable water supply for many small farm operators near Bozeman.

Last year members of the Severns, Tudor, and Beck-Border ditch groups decided to replace three aging structures with a new canal designed by the Soil Conservation Service, rather than attempt to repair the old headgates. Before consolidation, irrigation water had been diverted from the West Gallatin River with temporary dikes of gravel, straw bales, or logs.

Before enlarging the Beck-Border ditch, the three groups obtained legal counsel from a local law firm to protect water rights and to get property easements. They also signed a pooling agreement with the Agricultural Stabilization and Conservation Service for cost-sharing under the Agricultural Conservation Program.

Plans for ditch consolidation called for brush clearing, bank smoothing, grass seeding, and new

Montana
construction. A road on one side of the Beck-Border canal makes maintenance easier. A concrete headgate and diversion structure replaced the old headgates and gravel dike.

Contracts for the \$12,000 job were let separately. One contractor handled tree removal; another seeded grass and built the structures. A third constructed the concrete diversion and headgate—KENNETH HARMAN, *district conservationist, SCS, Bozeman, Mont.*

Conservation supervisors practice what they preach

Nebraska
District supervisors of the Sheridan County Soil and Water Conservation District, Nebr., raise interest in the Great Plains Conservation Program as well as cattle and wheat.

"First you establish a Great Plains Program on your own place. Then you can talk to neighbors about conservation—not the other way around," District Supervisor Charley Letcher says. He and the other board members set an example with this record of work completed under contract:

Grass seeding on 1,400 acres; 52 miles of terraces; 24 dams; proper grazing on 15,000 acres; crop residue management on 2,100 acres, and 10 wildlife windbreaks.

Plans to improve commercial operations include provisions for wildlife production and recreation. Pheasant population is high on all of the supervisors' ranches; deer and wild turkeys are especially plentiful on the ranches of Supervisors Frank Krotz and Herman Jungck.—WILFRED J. STUART, *district conservationist, SCS, Rushville, Nebr.*

Sewage lagoons aid school opening

Colorado
When difficulties with onsite sewage disposal threatened to prevent the opening of two schools in Mesa County, Colo., last fall, the county health department turned to the Soil Conservation Service for aid in solving the problem.

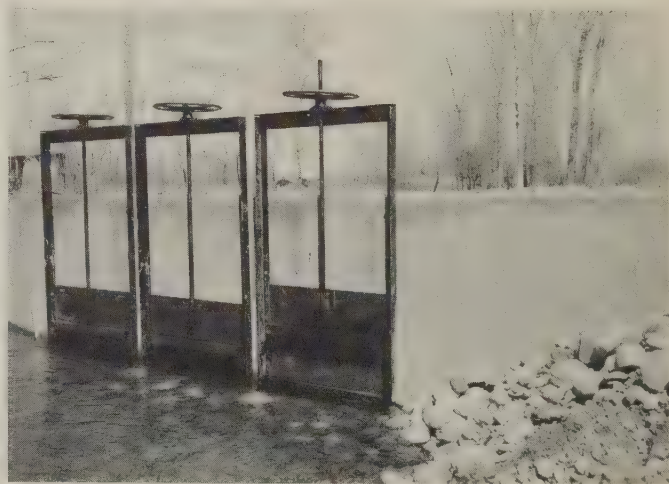
Onsite soil investigations at Gateway and Beaver Creek schools indicated that disposal through filter fields could not function properly because of severe soil limitations. Sewage lagoons appeared to be the most practical and least costly of the methods available.

Soil conditions at the Beaver Creek School were almost perfect for a sewage lagoon, so the facility was designed not only for the school but for the community near the

One of the old gates . . .



and one of the new ones.



Rajah Uranium Mine as well.

The soils at the Gateway School, however, were stony and cobbly and created problems. The only potential site was on the opposite side of West Creek and would require bentonite or other material to seal the lagoon.

The soil survey showed there was no suitable material locally, but a bed of bentonite on public land near Grand Junction could supply the sealant. The Bureau of Land Management granted a free use permit, and a small fee was charged for hauling the bentonite.

Thus the onsite sewage disposal problem for the schools was solved with the cooperation of local, state, and federal agencies.—CLAYTON F. SPEARS and JOHN C. DIXON, *soil scientist and district conservationist, SCS, Grand Junction, Colo.*

Indiana

Comfortable camping by a multipurpose lake

A dream came true for Sullivan County, Ind., when recreation facilities around its 461-acre flood-prevention structure were ready for weekend sailors, picnickers, and campers.

Picnic areas, boat docks and mooring, a launching ramp, and an ample beach line the shores of Sullivan County Lake, one of 26 structures in the Busserson Watershed Project sponsored jointly by

the conservation districts of Sullivan, Greene, Vigo, and Clay counties.

The Busserson Conservancy District was created to administer the works of improvement in the project, and the Sullivan County Park and Recreation District took over the development and operation of the recreation facilities. The Indiana Department of Natural Resources has seen to it that fishermen enjoy good catches by stocking and managing fish habitat.

Beside the lake, there are 180 units for tenting and trailer camping and also a group camping area for roughing it. Blacktopped roads and trailer pads minimize dust. City water and sewage lines, telephones, and electricity provide some of the essential comforts for campers' homes away from home. Concession stands, a beach house, and a trailer service center were also built on the 420-acre tract.

A hard-working board of directors put in many hours on the County Park and Recreation District's project. Thanks to their efforts and assistance from the Sullivan County Commissioners, the County Council, Farmers Home Administration, Extension Service, Busserson Conservancy District, SCS, and local citizens, Sullivan County has one more feature to attract industry, commerce, and homeowners. —DONALD V. WILSON, *district conservationist, SCS, Sullivan, Ind.*

Improvement of rangeland curbs erosion, grows beef

Cattle put on more weight while wind removes less soil from C. H. Fulfer's ranch near Mountainair, N. Mex., in the Clauch-Pinto Soil Conservation District.

Cropland conversion and a rotation-deferred grazing system have boosted weaning weights from an average of 350 pounds in 1960 to around 480 pounds. Also, carrying capacity of Fulfer's improved rangeland increased from 12 to 16 animal units per section.

Fulfer has participated in the Great Plains Conservation Program since 1959. At one time, 2,000 acres of his land was in beans. Last year, he reseeded the last 100 acres of former cropland on his ranch. Blue grama, Vaughn sideoats grama, and western wheatgrass provide dependable, nourishing cover.

Fulfer has built pit tanks, fences, and livestock water wells to relieve grazing pressure around old watering places. He also installed miles of plastic pipe to distribute water in six pastures. He cleared brush on 531 acres, but he has left pinon and juniper on slopes and gullies for deer, antelope, quail, rabbits, and other wildlife.—JOHN WERNER, *district conservationist, SCS, Roswell, N. Mex.*

Turkeys on Sheridan County ranch.



A cooperative recreation development.



Cooperation curbs erosion in interstate RC&D Project

By Robert A. Speich

RC&D Project coordinator, SCS, Princeton, W. Va.

Highway department officials of two states are helping local people stabilize and beautify roadbanks and mine spoils in an Appalachian Resource Conservation and Development Project.

Last year, in a cooperative venture with the Mountain Dominion RC&D Project, the West Virginia State Road Commission and the Virginia Department of Highways supplied men and machinery needed to seed 74 acres of bare roadbanks in the five-county project area.

Technical assistance and materials were provided by the RC&D Project in two West Virginia counties (Mercer and Summers) and three Virginia counties (Bland, Tazewell, and Giles). Tall fescue, sericea lespedeza, and crownvetch are now holding on slopes of 45° or more.

Special ACP funds

Special Agricultural Conservation Program funds totaling \$6,500 have been allocated for land treatment in the Wolf Creek watershed (Summers) and the East River watershed (Mercer). Sediment control is one phase of a 14-section effort to improve environment in the East River watershed. Extra funds for roadbank stabilization will come from the Princeton and Bluefield Garden Councils.

Twenty-seven acres of roadbanks in the nearly completed Brush Creek Watershed Project (W. Va.) will be hydroseeded this year with State Road Commission equipment.

Mine-spoil stabilization

Strip-mine spoil in Mercer County will be seeded to a mixture of black locust, fescue, lespedeza, and ryegrass by the Southern Soil Conservation District under contract with the surface-mining company in-

involved. The district will furnish men, materials, and equipment for work needed on 350 acres.

Bill Roller, Virginia Commissioner for the Division of Mined Land Reclamation, reports that 121 acres of strip-mine spoil near Boissevain and Shorts Gap (Tazewell County) was reclaimed in 1968. One hundred acres was hydroseeded; the rest was done by hand. Under a 1966 Virginia reclamation law, about 202 acres expected to be

Southern District crew plants outer slope of a strip-mine spoil area.

Crew uses hydroseeder belonging to Southern Soil Conservation District to spray seed and fertilizer on mine spoil.

distributed by permit holders during 1969 will be slated for revegetation in 1970.

Landowners in Giles, Bland, and Tazewell counties are also participating in the silt reduction campaign with the aid of the Appalachian Land Stabilization and Conservation Program. Each may have up to 50 acres of land treated with any planned and needed conservation practice under this program administered by the Agricultural Stabilization and Conservation Service. Efforts are being made to extend similar assistance to the West Virginia counties. ♦



Societies discuss agronomy and soils

The annual meeting of the American Society of Agronomy, Soil Science Society of America, and the Crop Science Society of America will be held in Detroit November 9-14.

"Agronomy and Health" will be the general theme, and a diverse program has been developed around this topic. Special symposia and other sessions are being planned by the Agronomic Division, Crop Science, and Soil Science members. Some of the symposium topics include "Aerospace Science and Agricultural Development;" "Production, Transport, and Metabolism of Photosynthate in Crop Plants;" "Laboratory Methods for Varietal Characterization;" "Water Utilization by Turfgrasses;" and "Graduate Teaching in Soils."

Tours planned are: Visits to the Michigan State University turfgrass research plots and facilities; Willow Run laboratories to view instrumentation for accumulating and analyzing remote sensing observations; Port of Detroit; southeastern Michigan to see examples of soil-land use relationships and the Macomb County Planning Commission; and to a dairy and truck farming area and to view hot house rhubarb and mushroom production.

Grange plans for new rural businesses

National Grange will hold its annual meeting November 10-19 in Daytona Beach, Fla.

Among other things, this organization will discuss ways to improve the economic facilities of rural America. Many of the people in rural areas are no longer active farmers but still live in smaller communities. Ways are being planned to bring in new business in these areas to supplement the income of these people.

Seed Conference aims at research-marketing

The 15th Annual Farm Seed Conference will be held on November 5 in Kansas City, Mo., following the annual convention of the Western Seedsmen's Association on November 2-4.

The theme, "Research-Marketing," aims at projecting a panoramic review of the latest information available on present and future research; and on marketing of farm seeds.

Dates and places

November 2-4, Western Seedmen's Association, Kansas City, Mo.

9-12, National Association of State Universities and Land Grant Colleges, Chicago, Ill.

9-12, National Forest Products Association, Boca Raton, Fla.

9-14, American Society of Agronomy, Detroit, Mich.

9-14, Soil Science Society of America, Detroit, Mich.

10-12, Geological Society of America, Atlantic City, N. J.

10-19, National Grange, Daytona Beach, Fla.

24-Dec. 1, General Assembly International Union for the Conservation of Nature, New Delhi, India.

December

1-5, National League of Cities, San Diego, Calif.

2-5, Western Forestry and Conservation Association, Spokane, Wash.

3-5, Congress of American Industries, NAM, New York, N. Y.

8-11, American Farm Bureau Federation, Washington, D. C.

9-11, Annual Corn and Sorghum Research Conference, Chicago, Ill.

9-12, American Society of Agricultural Engineers, Chicago, Ill.

26-31, American Association for the Advancement of Science, Boston, Mass.

27-30, American Agricultural Economic Association, New York, N. Y. ♦

Functions of SCS plant material centers

SCS plant materials centers have three functions: (1) To assemble, evaluate, select, and increase grasses and legumes for use in soil and water conservation; (2) to determine reliable cultural and management methods for their use; and (3) to get proved materials into production by farmers, ranchers, and commercial growers. ♦

Review



Design with Nature. BY IAN L. MCHARG. 1969. *Natural History Press*, Garden City, N.Y. 214 pp., illus.: 11 x 11 in. \$19.95.

The emergence of Ian McHarg, a salty Scot, as new high priest of ecology, conservation, and land use planning, is most easily understood after reading *Design with Nature*, his man-sized book of king-sized concepts, collected, he admits, "in a rag-bag of memories and assembled in a patchwork quilt."

Writing pungently as a multifaceted Harvard scholar, architect, urban planner, educator, naturalist, world traveler, and scientist, Dr. McHarg describes his book as "a personal testament to the power and importance of sun, moon, and stars, and changing seasons, seedtime and harvest, clouds, rain and rivers, the oceans and the forests, the creatures and the herbs . . . (our) co-tenants of the phenomenal universe."

Without doubt, it is a very important book—perhaps the best exposition available to professional soil conservationists studying multiple land use, inventory, planning, and potential.

Much of what McHarg says in his book is identical to advice that humble conservationists from SCS have been dispensing for years—namely, leave trees on steep slopes, keep subdivisions out of flood plains, use good agricultural land for agricultural purposes. The major difference between McHarg and the SCS fellows over at the courthouse is that he holds a world-view with significant metaphysical implications.

For McHarg, and others, the problems of man's survival are rapidly approaching cataclysmic dimensions. With impassioned language, he pleads for sanity in using the resources at hand while lashing the "uglifiers whose ignorance, stupidity, and greed have produced our

scabrous towns, raped land, filthy air, pathetic subdivisions, derelict industries, and befouled rivers."

He alternates chapters of theoretical, but never idle, discussions with how-it-was-done accounts of case studies in specific geographic areas, such as the Potomac Basin, New Jersey shore, and Manhattan area. Some solutions are offered, but if area planners want the full story they can retain his prestigious Philadelphia architectural firm.

Despite structural flaws in the book and numerous difficult-to-read passages, McHarg succeeds memorably in portraying vast inescapable conservation problems that must receive immediate attention if civilization is to survive.—PERRY FLIPPIN, *Information Division, SCS*.

Audio-visuals

The Soil Conservation Service has revised its color slide set, "Know Your Land," an introduction to the soil capability classification system used by soil conservationists and farmers.

The set, No. C-8, containing 50 slides and an illustrated narrative guide is available for \$8.00 from Photography Division, Office of Information, U.S. Department of Agriculture, Washington, D.C. 20250.

It is also available as a filmstrip for \$5.50 from Photo Lab, Inc., 3825 Georgia Avenue, N.W., Washington, D.C. 20011.

Other slide sets produced by SCS and available at the above addresses include:

To Save Our Land. 1967. No. C-141. 48 frames. Slide set \$8.00, filmstrip \$5.50. A general history of SCS from the early thirties to the present time.

Watershed Projects for Protection and Profit. 1966. No. C-128. 55 frames. Slide set \$9.00, filmstrip \$6.50. An introduction to the small watershed program (Public Law 566) and how projects are developed for flood prevention, recreation, municipal water supply, etc.

America The Beautiful. 1961. No. C-77. 52 frames. Slide set \$9.00, filmstrip

\$6.50. A slide set of the America The Beautiful series showing the beauty of rural America. A representative scene from each state plus Puerto Rico and the Virgin Islands is included.

New Publications

Natural Resources of Minnesota. 1969. U. S. Dept. Interior. 46 pp., illus. \$0.60. Twenty-second in a series of reports on the natural resources of the states, this one presents the historical heritage of the North Star State. Minnesota serves as the northern gateway to the West, is one of the great dairy states, and ranks second only to Wisconsin in milk production. Livestock and livestock products provide the greatest income to farmers, and grains are also a great source of income. The potential wealth of Minnesota's forests and mineral production are immense. Her more than 15,000 lakes and the Mississippi River and its tributaries provide water for power and these water resources together with much recreation parkland make her a year-round vacationland. The Forest Service, U. S. Army Corps of Engineers, and Soil Conservation Service contributed to the booklet.

Flow and Retention of Water in Layered Soils. By D. E. MILLER. 1969. USDA Conservation Research Rpt. 13. 28 pp., illus. \$0.25. The principles of water retention in layered soil were developed in laboratory studies, with model and field profiles, and by numerical techniques. In terms of the conventional available water, a layered soil will hold 50 to 60 percent more available water than will a similar depth of uniform soil. The amount of water held by a layered soil increases as the underlying particles become coarser and is greatest adjacent to the soil-layer interface. It decreases with elevation above the layer.

Water and Wastewater Technology. 1968. U. S. Dept. of Health, Education, and Welfare and U. S. Dept. of Interior Technical Education Program Series 11. 131 pp., illus. \$1.50. Aid to vocational educators and other interested persons and agencies to plan urgently needed water and wastewater technology programs, or evaluate existing ones, by offering a suggested 2-year post high school curriculum and course outlines. Also supplies information on technical education procedure, facilities, equipment and costs, texts and references, and scientific and technical societies.

Summary of Reservoir Sediment Deposition Surveys Made in the United States Through 1965. COMPILED BY F. E. DENDY AND W. A. CHAMPION. 1969. USDA Misc. Publ. 1143 64 pp., illus. \$0.65. Supersedes and updates Miscel-

laneous Publication 964 of the same name through 1960. It repeats all reservoir surveys reported in No. 964 and includes unreported surveys made before 1964, new data on reservoirs surveyed or resurveyed since 1960, and some information on debris basins. The reservoirs are located in all of the 48 states, except Maine and Florida, and in Puerto Rico. The table gives for each reservoir the average annual sediment accumulation per square mile of drainage and related data. A supplement to the bulletin gives detailed data for each reservoir.

Annual Lespedeza, Culture and Use. By P. R. HENSON AND W. A. COPE. 1969. USDA Farmers' Bull. 2113. 16 pp., illus. \$0.15. Superseding Farmers' Bulletin 1852, *Lespedeza: Culture and Utilization*, and Leaflet 240, *Kobe, A Superior Lespedeza*, describes the two species of annual lespedeza, *Lespedeza striata* (striate) and *L. stipulacea* (Korean), and their use.

Sudangrass and Sorghum-Sudangrass Hybrids for Forage. 1969. USDA Farmers' Bull. 2241. 12 pp., illus. \$0.15. Superseding Farmers' Bulletin 1126, *Sudan Grass*, describes the grass and varieties and gives information on preparation and harvesting of the grass and table listing the common pests and their control.

Products of American Forests. By F. J. CHAMPION. 1969. USDA Misc. Publ. 861. 30 pp., illus. \$0.50. Lists the many uses of the wood products and wood chemical products.

Fishing in the National Park System. Rev. 1969. U. S. Dept. of Int. 16 pp; map. \$0.30. A listing of the parks, their addresses, and fishing resources.

Soil surveys

Lake County, Tennessee. By WILLIAM T. BROWN, W. C. JACKSON, G. L. KEATHLEY, AND C. L. MOORE. 1969. 39 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Montgomery County, Illinois. By C. E. DOWNER AND R. T. ODELL. 1969. 94 pp., illus.; maps 4 inches to the mile (1:15,800). Fieldwork by C. E. Downey, R. L. Allison, F. N. Carroll, D. R. Grant-ham, D. B. Phillips, B. J. Weiss, R. F. Wicks, R. H. Andersen, J. B. Fehren-bacher, C. J. Frazee, P. R. Johnson, C. D. Sopher, and L. P. Wilding.

Plymouth County, Massachusetts. By CHARLES W. UPHAM. 1969. 116 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soil surveyed by Charles W. Upham, Rino J. Roffinoli, and Carl B. Newsome.

Washabaugh County, South Dakota. By ROBERT E. RADEKE. 1969. 62 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by John Foreman, Edward Bookless, Rex L. Carey, Richard Krueger, Roy Lembke, Jack Safford, and Albert Thurman.

From the Administrator:

Service in the seventies

In September, I met with our 50 state conservationists near Jackson, Wyo., in the magnificent setting of the Grand Tetons, to think and talk about the role of the Service in the seventies.

To provide a base for the week's effort, I asked our conservationists to study carefully the work we are doing now and to give me their best thinking on which activities need expanding, which need changing, and which should be curtailed or abolished.

"The more of a sacred cow an operation is," I reminded them, "the more it probably needs a critical review."

I also asked them to take a hard look at the many new areas in which the Service is being called upon to give technical assistance—help to planning and zoning commissions, pollution control authorities, land developers and tax assessors, and so forth.

"Let's try to define the most useful contributions we can make in each of these areas," I said, "keeping in mind that changes already underway in America are likely to accelerate in the decade ahead."

For the next 3 days, the state conservationists were divided into four working parties, each organized to reflect a cross-section of the whole country.

The comments and recommendations which emerged from those sessions cover many pages, and they include minority views as well as majority views. Little would be served by making them public in their entirety; they are internal documents for my use and the use of my staff. But it is possible at this time to indicate some of the main directions in which the thinking of our conservationists headed.

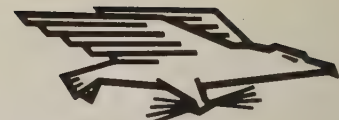
- Most state leaders foresaw increased demand for resource planning assistance to groups, communities, areas, and regions, and they said we had better gear up now, with better training, more specialists, and more efficient procedures to deal with this challenge of the seventies.

- They predicted an increasingly broad role for the Service in the field of pollution abatement and environmental improvement.
- They called for more accurate information on sources of sediment and the effect of sediment-control measures.
- They suggested seeking a substantial increase in assistance from non-Federal sources, like contractors, conservation districts, and landowners.
- They had nothing but praise for the NACD District Outlook approach and thought the Service should encourage and assist districts in meeting District Outlook goals.
- They felt that the Service should continue to lead in the design and application of sound technology for planning and installing conservation and resource development programs. Again, they called for updated training and specialists in new fields, like sanitary engineering, ecology, and landscape architecture.
- They gave strong backing to an intensified Service information program to explain our activities to all Americans. They also endorsed increased support for conservation education activities.

Finally, they called for a national long-range program for the Service; some said for the seventies, some called for an even longer-range plan. But there was general agreement that the Service needs to establish its goals and objectives clearly and to set forth a program to meet those objectives and goals.

It was an excellent meeting and one which gave me a great deal of personal satisfaction.

Kenneth E. Grant



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Soil survey benefits in millions to urban communities



Paul F. Saint (left), chairman of the Needham Board of Selectmen; Everett L. Francis of SCS; and Thomas Quarles, chairman of the Needham Conservation Commission, inspect sample of underlying soil.

Soil survey benefits to Massachusetts communities are in the millions of dollars.

And Needham, like many other towns in Massachusetts, is having a soil survey made to help assess soil, water, and related natural resources and to pinpoint projects for immediate action. Activities in Needham are typical of what many of the Commonwealth's communities are doing. This town completed a master plan in 1966. Needham's soil survey and a later natural resources inventory will provide basic informa-

tion to improve the town's overall comprehensive plan.

The town is sharing the cost for its survey with the Soil Conservation Service through arrangements for this technical help by the Norfolk Conservation District.

The soil survey report will include a description of all of the soils in the town (i.e., township) with maps showing their location. Interpretations are made for a wide variety of urban uses.

These interpretations, setting forth limitations for home, school,

and commercial and industrial sites, and for septic tank sewage disposal, deal primarily with building and construction operations. Information on limitations for agricultural use, woodlands, and for wet-land wildlife sites are also given.

Interpretations are made for other uses, including highways, athletic fields, sanitary landfill, cemeteries, and installation of water and sewer lines. Several interpretations provide general information showing depth of seasonal highwater table, land slope, surface runoff, and sources of sand and gravel. Each town decides what soil interpretations are most needed.

Many Massachusetts towns and communities have cost-shared with SCS for a soil survey with urban interpretations over the last few years. Seventy-five of Massachusetts' 351 communities have received soil survey reports covering more than a million acres. Ten towns are being mapped this field season. During the past few years, about 85 percent of the time of SCS soil scientists in the Commonwealth has been devoted to soil surveys for towns.

Big savings to Massachusetts communities are resulting from these surveys. More accurate information is available to solve project problems and as a basis for cost determinations. Some projects that might otherwise have been doomed to failure are not being started. A recent canvass showed realized benefits of \$175 for every dollar of survey costs.—WILLIAM H. COATES, assistant state conservationist, Amherst, and ROBERT N. MOREHOUSE, district conservationist, SCS, Acton, Mass. ♦

35/5 December 1969

The updated
Conservation Needs Inventory

Also
Resources and industry

Soil Conservation Service
U. S. Department of Agriculture

Soil **Conservation**

Devoted to the wise use of land and water resources



Where we stand . . .

In a time of general questioning of national directions, we can well ask where we stand in the care of basic natural resources.

Updating of the National Inventory of Soil and Water Conservation Needs gives us no cause for complacency.

We publish the first general account (p. 99-109) of the findings of more than 3,000 county committees reexamining the way our private land is used and the adequacy of its conservation treatment.

The national summary figures are provided by Julius Mai and Armin Grunewald, who led the tedious task of bringing together, verifying, and collating the thousands of answers from State Conservation Needs Committees. B. D. Blakely wrote the report on cropland and pasture, R. E. Williams on native grazing land, C. T. Prout on forest, and Carl Fetzner on watershed projects.

Some of the figures are not final to the last digit, but their significance is. The fact that nearly two-thirds of our private rural land is inadequately treated after 3 decades of national effort surely means that conservation is a continuing job, not one that can be tidily finished and put behind us.

Base for industry

A case study of an RC&D Project (p. 110) by Dale Munk (SCS) and Clarence Parker (Ext.) clearly shows that soil and water resources are the base for industrial development in an area.

COVER: An adequately treated farm landscape in Wisconsin has contour stripcropping and terracing on the cultivated land and permanent cover of grass or trees on the steeper slopes.

Soil Conservation

Devoted to the wise use of land and water resources

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Another look at our resources

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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Conservation Needs Inventory

A preliminary report on the updated figures, base year 1967

The National Inventory of Soil and Water Conservation Needs portrays the use and condition of our privately owned rural land today. Revised data as of base year 1967 are now being prepared for publication in state and national reports.

Eight U. S. Department of Agriculture agencies and U. S. Department of Interior's Bureau of Indian Affairs cooperated in updating the 1958 county-by-county inventory of land use and conservation treatment needs of the Nation's nonfederal rural land and the inventory of watershed project needs.

Department of Agriculture agencies participating in the 3-year study are the Agricultural Research Service, Agricultural Stabilization and Conservation Service, Economic Research Service, Farmers Home Administration, Federal Extension Service, Forest Service, Soil Conservation Service, and Statistical Reporting Service. Leadership was assigned the Soil Conservation Service. Representatives of Land Grant Colleges, state agencies, and interested county organizations participated on the state and county levels.

The new land use inventory shows 1,438 million acres of nonfederal rural land in the 50 states. Of the total inventory acreage, 437.6 million acres is cropland, 481.9 million is pasture and range, 462.3 million acres is forest, and 56.2 million acres is classed as other land.

The data show that we now have 10.1 million acres less cropland than in the 1958 inventory, 3.5 million acres less pasture and range, 9.6 million acres more forest, and 10.8 million acres less other land. This is a net shift of almost 15 million acres out of inventory

to nonfarming uses since the 1958 inventory. Most of the loss went into urban and builtup uses, some to federal noncropland, and a lesser amount went under water in ponds and reservoirs.

Conservation treatment needs were estimated for the land in its present use. Thirty-six percent of all land in the inventory is adequately treated for soil and water conservation. By land uses, the part adequately treated is 37 percent of cropland, 29 percent of range, 28 percent of pasture, 38 percent of forest, and 71 percent of other land.

No attempt was made to identify potential alternative or multiple uses. Such can, however, be determined for any specific soil from the soil descriptions and interpretations maintained in Soil Conservation Service offices across the Nation.

In the watershed projects inventory 19,194 drainage areas were identified and delineated. Of these, 8,904 project-size hydrologic units are rated potentially feasible for project development under the Watershed Protection and Flood Prevention Act, Public Law 566.

The kind and extent of watershed problems needing project action and eligible under provisions of Public Law 566 were estimated for each watershed.

The vast amount of information in the Conservation Needs Inventory highlights the land-resource problems facing the Nation, and shows in general where the problems are. The data can serve as a basis for future resource development in planning ahead for production of food and fibre, including wood products, to meet the demands of our society.

Some of the figures in this report are preliminary and subject to correction. Changes probably will not affect more than the final digit in any case. Because of rounding, some totals in tables may not equal the sum of the items listed.



Cropland

59 percent of cropland needs conservation treatment

Of the 437.6 million acres of cropland in the United States, 37 percent (about 161 million acres) is adequately treated for soil and water conservation. Four percent is on land in capability classes V, VI, VII, and VIII and needs to be converted to a different use. The remaining 59 percent needs some sort of conservation treatment.

Of the cropland in tillage rotation, about 38 percent is in row crops; 24 percent in close-seeded field crops such as small grain and rice; and 18 percent in grasses and legumes, either as part of the cropping system or as permanent hay. The remainder is in fallow, diverted acres, or temporarily idle.

The total amount of cropland has decreased by 10.1 million acres since 1958, from 447.7 to 437.6 million acres. Nearly 90 percent of the reduction has occurred in the

Southern and Northeastern states where population concentrations create a demand for even more food and fiber from the remaining acres.

Cultural or mechanical practices need to be applied on 276.8 million acres—more than 60 percent of the cropland—to hold soil losses to an acceptable minimum.

Sixteen percent of the cropland in tillage rotation needs only annual residues or cover crops. Five percent requires more sod in the cropping system, including several million acres of permanent hayland that should be reseeded or fertilized.

Terraces, stripcropping, and diversions are needed on 22 percent of the cropland to reduce water and wind erosion. This combination is recommended as adequate treatment on about 2 out of every 5 acres that have erosion problems.

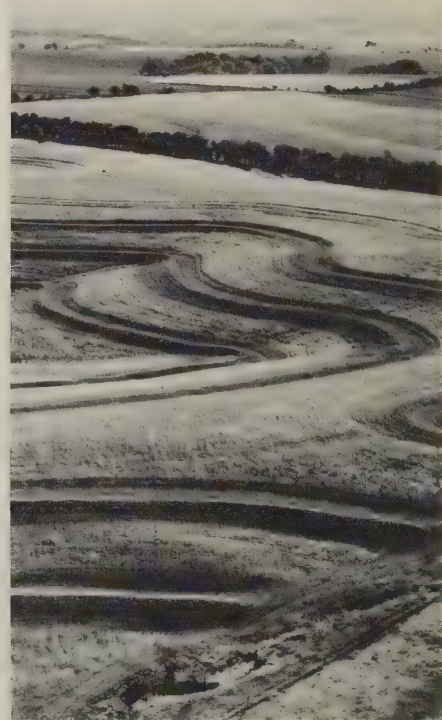
One out of every 3 acres with a water hazard needs to be drained.

While complete information is not available for the updated inventory, figures from 26 states indicate that 75 percent of the land in need of conversion to alternative uses is in classes V through VIII.

About 40.5 million acres of cropland is irrigated, 36.4 million acres in the 17 Western states. Row crops are grown on 46 percent of the irrigated acreage, hay on 30 percent, and small grain or rice on 20 percent.

About 29 percent of the irrigated cropland is adequately treated and 12 percent needs only cultural measures, such as effective use of residues and good tillage practices. These portions of the irrigated cropland, or about 41 percent of the total, have good irrigation systems and proper water management.

82.6 million acres needs stripcropping, terraces, and diversions.

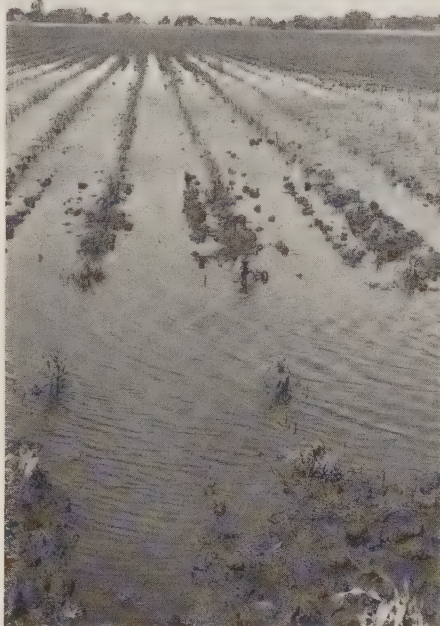


Cropland includes all cultivated land used for field crops or hay and pasture in rotation; cropland temporarily idle or diverted from production under government programs; permanent hayland; orchards, vineyards, and bush fruits; and open land formerly cropped and not converted to another use.

Of the remaining 59 percent that needs treatment, 15.8 million acres needs improved irrigation systems. This is the most needed practice in all of the states with large acreages of irrigated cropland, with the exception of Wyoming, where water management is the most needed. In addition, 8.2 million acres has good irrigation systems but needs proper irrigation water management.

Conservation Treatment Needs

	Acres (Mil- lions)	Per- cent
Tillage rotation (dry land):		
Treatment adequate	139.6	37
Residue management and annual cover	60.8	16
Sod in rotation	22.2	6
Contouring only	16.0	4
Stripcropping, terraces, and diversions	82.6	22
Change in land use to permanent cover	15.7	4
Drainage system	43.4	11
Total dry land in tillage rotation	380.3	100
Irrigated cropland:		
Treatment adequate	11.7	29
Cultural management	4.8	12
Improved irrigation system	15.8	39
Water management	8.2	20
Total irrigated cropland	40.5	100
Total tillage rotation	420.8	
Open land formerly cropped:		
Treatment adequate	7.1	61
Conservation treatment needed	4.5	39
Total open land formerly cropped	11.6	100
Orchards and vineyards:		
Treatment adequate	2.3	45
Conservation treatment needed	2.8	55
Total orchards and vineyards	5.1	100
All cropland:		
Treatment adequate	160.7	37
Change in land use needed	15.7	4
Conservation treatment needed	261.1	59
Total all cropland	437.6	100



15.8 million acres needs improved irrigation systems.

43 million acres needs improved drainage.

60.8 million acres needs only residue management and annual cover.



Native grazing land

66 percent of rangeland needs conservation treatment

Grazing is the primary use of 380 million acres of rangeland and 47 million acres of noncommercial forest land in the United States. In addition, grazing is practiced on 90 million acres of commercial forest land, where it is a compatible secondary use when sound grazing management systems are followed.

About 29 percent of nonfederal rangeland in the United States is adequately treated according to current conservation standards. Grazing land can be maintained, of course, only through continued proper grazing use. About 5 percent of the total is not feasible to treat, due to soil, topographic, or climatic limitations, leaving 66 percent needing treatment to reach soil and water conservation objectives.

Of the noncommercial forest land being grazed, about 70 percent needs improvement for grazing use and 9 percent needs reduction or elimination of grazing to protect the land against soil deterioration or to improve the cover.

Native grazing land differs from improved or tame pastureland in that the plant cover consists of a community of several to many kinds of native plants, rather than one or a few tame species. In addition, native plant communities are long-lived—indeed, they may persist and improve in perpetuity under judicious grazing management.

The diversity of plants on native grazing land makes it valuable for several compatible secondary uses in addition to forage production and grazing by livestock. Big game animals and other wildlife also find a large part of their habitat on rangeland and related grazing lands. Good grazing land management is also good wildlife management for many important kinds of animals.

Rangeland is land on which the natural potential (climax) plant cover is composed principally of native grasses, forbs, and shrubs valuable for forage. It includes natural grasslands and savannahs or brushlands not included in forest land.

Rangeland treatments and practices sometimes can be altered to improve wildlife habitat while fulfilling their primary objectives. For example, brush of value for cover and food for deer can be left along rough ridges and watercourses. Large level areas can be cleared in strips to improve forage for livestock, yet leaving some brush for wildlife. Areas on which brush is controlled produce more forage for livestock, and the edges between the cleared and uncleared strips favor deer and upland game.

The nature of the plant cover on native grazing land also has a significant influence on erosion, surface hydrology, and sediment loads in streams and lakes.

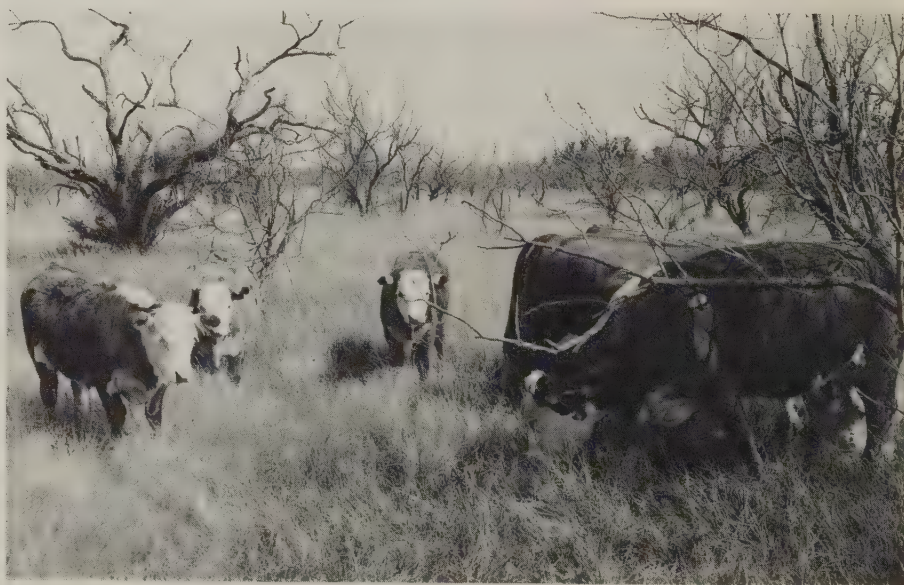
The scope of native grazing land

as open space and its diversity in plants, topography, domestic animals, and wildlife invite a growing number of outdoor recreationists.

In considering conservation needs and the application of practices, both primary and compatible secondary uses of the land must be considered.

Treatments defined in the Conservation Needs Inventory relate, in some cases, to cultural treatments such as seeding, brush control, and the like. The most vital aspect of grazing land management, however, is the proper manipulation of grazing animals to achieve desired degrees of forage harvest. Proper grazing use, resulting from proper kinds and numbers of livestock, proper season of use, and planned grazing systems, is an essential element in all treatment needs discussed.

51.5 million acres of range needs improvement with brush control.





111.9 million acres of range is adequately treated.

Kinds of Native Grazing Land

	Acres (Millions)
Rangeland	380
Noncommercial forest	47
Commercial forest	90
Total	517

Conservation Treatment Needs

	Acres (Millions)	Per- cent
Rangeland:		
Treatment adequate	111.9	29
No treatment feasible	16.9	5
Change in land use	0.1	
Only protection from overgrazing	123.3	32
Improvement of present plant cover	40.0	11
Improvement with brush control	51.5	14
Reestablishment of plant cover	11.8	3
Reestablishment with brush control	24.6	6
Total rangeland	380.1	100
Forest land being grazed:		
Treatment adequate for grazing use	9.7	21
Needs improvement for grazing use	33.0	70
Needs reduction or elimination of grazing	4.3	9
Total noncommercial forest	47.0	100

16.9 million acres of range is not feasible to treat.

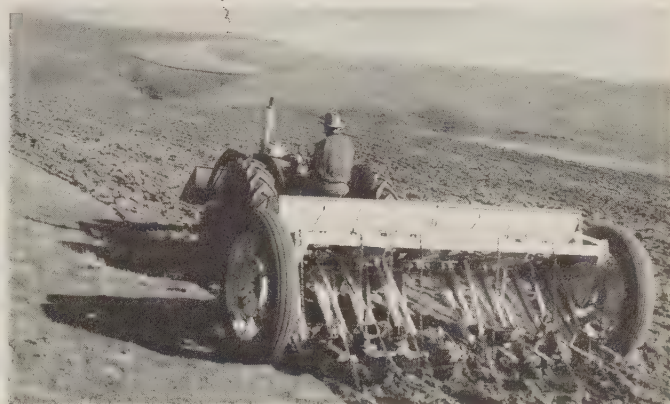


123.3 million acres of range needs only protection from overgrazing.

24.6 million acres of range needs reestablishment with brush control.



11.8 million acres of range needs reestablishment of plant cover.





33 million acres of noncommercial forest needs improvement for grazing use.



90 million acres of commercial forest land is grazed.

Pastureland

68 percent of pastureland needs conservation treatment

Of the nearly 102 million acres of pastureland in the United States, 70 million acres or 68 percent needs some kind of conservation treatment to improve the condition of vegetation and meet the needs for forage on farms and ranches.

About 28.2 million acres of pastureland is adequately treated. Nearly 3 million acres should be converted to forest or other noncrop land use, and another 1.3 million acres is not feasible to treat.

Of the pastureland feasible to treat, 25 million acres could be improved by the application of lime and fertilizer, 13.6 million acres needs only proper grazing, and nearly 5.5 million acres needs brush control. On these areas the present vegetation is of the right kind but attention needs to be given to management practices to realize the full potential of the grazing resource. With these kinds of improvement, it is possible to increase forage production to two to three times that obtained under present conditions.

Pasture includes lands producing forage plants, principally introduced species, primarily for grazing and not included in cropland rotation; includes native pasture in humid areas and may contain shade or timber trees if the canopy is less than 10 percent.

The remaining 26 million acres of pasture feasible to treat is in such condition that the areas need reestablishment of forage plants, either with or without brush control. These conditions are most prevalent in the Midwest and Southern states. Twenty-six states reported that of the acreage needing reestablishing, 77 percent is on land-capability classes I through IV.

Returns from 26 states indicate that more than two-thirds of the permanent pasture is on land of capability classes I, II, III, and IV. Of the acreage needing reestablishment of forage plants, 77 percent is on land of these capability classes.

Conservation Treatment Needs

	Acres (Mil- lion)	Per- cent
Treatment adequate	28.2	28
No treatment feasible	1.3	1
Change in land use	2.2	3
Only protection from overgrazing	13.6	13
Improvement of present plant cover	27.9	27
Improvement with brush control	5.5	5
Reestablishment of plant cover	14.2	14
Reestablishment with brush control	8.9	9
Total pasture	101.8	100

It is evident, therefore, that most pastures are on soils that will respond to treatment and management.

*28.2 million acres of pasture
is adequately treated.*



*2.2 million acres needs to be
changed to other land use in
permanent cover, and 1.3
million acres is not feasible to
treat.*



*47 million acres needs only improve-
ment of present plant cover, such
as proper grazing, application of
fertilizer, and brush control.*



*23.1 million acres needs reestablish-
ment of plant cover, either with
or without brush control.*

Forest land

71 percent of commercial forest needs conservation treatment

The Conservation Needs Inventory covers about 462.3 million acres of forest land outside the National Forests and other public lands of the United States. Of this, 398.2 million acres is commercial forest and 64.1 million acres is noncommercial.

These are the private forest resources of the United States, comprising an area 2½ times the extent of public forest lands. The inventoried acreage is owned by more than 4 million people who must maintain, protect, and, where needed, improve their share of the Nation's forest resources if people are to have the products they will need in the future.

The size of the job—largely a continuing or recurring one—is indicated by the fact that 71 percent of the commercial forest land now needs some kind of conservation treatment. About 26 percent needs establishment or reinforcement of existing stands and 45 percent needs timber-stand improvement. About 29 percent needs no treatment.

Forest land includes land that is at least 10 percent stocked with forest trees and that is capable of producing forest products or influencing a water regime; land that formerly grew trees and is not currently developed for nonforest use; chaparral areas in the West; and land that has been planted to trees.

Noncommercial forest land, by its nature, does not lend itself either economically or physically to treatment. In some instances, reestablishment or reinforcement of the stand is needed for watershed protection, wildlife habitat improvement, or to hide the scars of past misuse. About 4 percent of the acreage needs such treatment; the rest is not feasible to treat.

The 116.0 million acres of commercial forest land on which no conservation treatment is needed has a good stand of trees of species suited to the soil and site conditions. Some of these areas are at the stage in growth that improved timber harvesting can be carried out, and others are young thrifty growing stands that do not need immediate

attention but which, within a few years, may need thinning or other improvements to bring them to a merchantable size.

Some 103.6 million acres of commercial forest land is producing below its potential because of inadequate stocking. Some areas must be completely reforested; some may be brought to adequate stocking by planting the open areas; and others can be improved by conversion from one kind of tree to a better one.

Timber-stand improvement is the most prevalent conservation need on forest land. According to the inventory, 178.6 million acres needs improvement of various kinds to bring them into full productivity. Among the measures needed are thinning stands of young trees be-

About 116 million acres of commercial (left) and 61.8 million acres of noncommercial (right) forest land needs no treatment.



Conservation Treatment Needs

	Acres (Mil- lion)	Per- cent
Commercial forest:		
Treatment adequate	116.0	29
Establishment or rein- forcement of stand	103.6	26
Timber stand improvement	178.6	45
Total commercial forest	398.2	100
Percent of all forest		86
Noncommercial forest:		
Treatment adequate	61.8	96
Establishment and rein- forcement of stand	2.3	4
Total noncommercial forest	64.1	100
Percent of all forest		14
All forest:		
Treatment adequate	177.8	38
Establishment and rein- forcement of stand	105.9	23
Timber stand improvement	178.6	39
Total forest	462.3	100
All forest grazed (included in above):		
Treatment adequate	29.1	21
Needs treatment to improve forest	64.5	47
Needs reduction or elimination of grazing	43.2	32
Total forest grazed	136.8	100
Percent of all forest		30

low a commercial size, removing inferior trees to allow the straight thrifty ones room to grow, removing poor quality and poorly formed trees that overtop more desirable ones, and the improvement of individual trees by pruning.

In some sections of the country grazing is a use compatible with

103.6 million acres of commercial forest land needs reestablishment or reinforcement of timber stands by planting (left) or natural regeneration (right).



178.6 million acres of commercial forest land needs timber-stand improvement by thinning or removing inferior trees.

growing timber products, and 89.8 million acres of commercial forest is now grazed. Of this, 19.4 million acres will safely produce forage for livestock or wildlife without additional treatment. On 31.6 million acres some type of treatment is needed to improve forage.

On other areas, grazing is not a compatible use, and 38.8 million acres of commercial forest land needs to have grazing reduced or eliminated.



Watershed projects

46 percent of upstream watersheds need project action

The Watershed Project Inventory, as a part of the National Inventory of Soil and Water Conservation Needs, makes an independent appraisal of the Nation's land and water resources as hydrologic units. It identifies needs for project action over and beyond the conservation-treatment needs determined for land in each major use as reported in the preceding pages.

The upstream watersheds were delineated and appraised on an individual basis according to criteria that apply to projects under the Watershed Protection and Flood Prevention Act, Public Law 566.

First, the area of the 48 conterminous states was divided into 19 major drainage areas. Hawaii was considered separately and Alaska was not included in the inventory. Each of the major drainage areas

was further subdivided into principal river basins, and these, in turn, into tributaries having drainage areas larger than 750 square miles. Within each tributary, project-size watersheds were delineated, and each watershed was studied from maps and by actual examination on the ground.

Local inventory committees and technical staffs considered those problems expected to require attention within the next 10 years. They estimated the kinds of improvements needed and whether project-type undertakings were physically and economically feasible. Substantial areas of deserts and mountains where it was apparent that watershed measures would not be needed or feasible within the next 10 years were blocked out into arbitrary units and studied in less detail. Some

Watershed Project Inventory

	No.	Acres (1,000)
Watersheds delineated	19,194	1,930,770
Watersheds feasible for project action	8,904	724,720
Percent of delineated watersheds feasible	46	38
Problems Needing Project Action		
Floodwater and sediment damage		
Agricultural		92,662
Urban		2,821
Erosion damage		72,844
Agricultural water management		
Drainage		65,367
Irrigation		16,732
Nonagricultural water management		
Rural water supply	5,540	
Municipal or industrial water supply	4,945	
Recreation development	12,396	
Fish and wildlife habitat	13,059	
Water-quality control	8,778	

8,904 upstream watersheds need multipurpose flood-prevention projects.



19,194 project-size watersheds and other inventory areas were delineated and studied. The total flood-plain area within these watersheds is about 134 million acres. Of this area some 129 million acres is rural land and 5 million acres is within urban areas. This is the best information about the total area subject to flooding in the upstream watersheds that has been obtained up to this time.

Additional studies were made to determine which watersheds are potentially feasible for project-type action under the provisions of Public Law 566. A watershed was considered a potentially feasible project if the estimated benefits are greater

than the estimated costs for needed flood-prevention or agricultural water-management measures.

About 46 percent of the delineated watersheds, including 38 percent of the area, were considered potentially feasible projects. The 8,904 feasible projects average about 81,400 acres in size, a total of 724.7 million acres.

The problems needing project action in the 19,194 watersheds include floodwater and sediment damages on 92.7 million acres of agricultural land and 2.8 million acres of urban land. Severe erosion damage needing project-type action occurs on 72.8 million acres. Drainage improvements are needed on

65.4 million acres, and irrigation is needed on another 16.7 million acres.

Multiple-purpose development is an effective way to provide for resource needs in a watershed area by combining water supply and control facilities with flood-prevention measures. There are needs and potentials for developing rural water supply in 5,540 watersheds; municipal and industrial water supply in 4,945 watersheds; recreation development in 12,396 watersheds; fish and wildlife improvement in 13,059 watersheds; and water-quality control in 8,778 watersheds. ♦

95.5 million acres of flood plain is subject to floodwater and sediment damage.



In addition to flood prevention, there is need for municipal or industrial water supply in 4,945 watersheds, recreation development in 12,396 watersheds, and fish and wildlife development in 13,059 watersheds.



Resources and industry

Conservation and development of land and water bring payrolls to people of Upper Willamette RC&D Project

By H. Dale Munk and Clarence R. Parker

RC&D Project coordinator, SCS, and community development specialist,
Cooperative Extension Service, Eugene, Oreg.

Fifteen major construction projects and six new industries have brought a new tempo to the economy of west central Oregon since the Upper Willamette RC&D Project went into operation less than 5 years ago.

"Industry benefits in a multitude of ways when local people join to form an RC&D Project," says W. G. Nash, president of the local project organization.

Preparing the land for intensified use has been a goal of the project sponsors since operations were authorized in March 1965. "Agriculture and people living on the land are the chief beneficiaries, but industry must use resources to operate, and that's where we come in," Nash continues.

The project plan calls for flood control, irrigation, drainage, and recreation and forest resource development. These multiple activities are directed by an executive board representing six soil and water conservation districts, three county governments, and the state soil and water conservation commission.

To date, 306 measures have been proposed to the executive board of

the project by local interest groups. Of these, 192 have been activated, 72 are complete and in operation, 54 are under construction, and plans are being developed for 66. "The completed project measures have meant a \$3,961,750 annual gross income for the project area," Nash says.

The Willakenzie Watershed Project under Public Law 566 has completed flood-control dike and channel construction, totaling \$386,145, that has benefited Interstate Highways 5 and 105 and made it possi-

ble for three major industries to go into full operation. In addition, two subdivisions, two shopping centers, an 800-student junior high school, an 1,800-student high school, and hundreds of homes have been built in an area where periodic floods formerly occurred from the McKenzie River. The Southern Pacific Railroad is now developing plans for a major industrial center.

Francis Waggoner, Lane County surveyor, estimated that the watershed project prevented \$300,000 in property damage from the one major storm in December 1964.

Fifteen major construction projects were completed in the project area during the past year, including four structures for bank stabilization, three for irrigation, and seven for flood prevention. One major dam was constructed by the Army Corps of Engineers for flood control, recreation, power generation, and other downstream benefits. This dam, the flood-prevention measures of the watershed project, and other water control structures have made it possible for farmers to convert from grass seed to higher income crops,



Upper Willamette RC&D Project supported American Can Company in building its \$40 million pulp and paper mill in the area.



The new Hulbert Lake Irrigation Project diverts water from Long Tom River to irrigate about 4,000 acres.

such as bush and pole beans, sweet corn, strawberries, blackberries, and mint.

Land improvements help

The three new irrigation systems provide water to 2,600 acres and a more reliable supply of irrigation water to an additional 2,500 acres. George Lowe, a leader in the Hulbert Lake Irrigation Project, says, "The irrigation project has increased my alfalfa hay production from 11,000 to 17,000 bales on the same land and my silage corn yield has increased by 10 tons."

Such land improvements were in the minds of officials planning the Hudson House Food Processing Plant. Roy Driskill, plant manager, states, "We settled in the Harrisburg area because of the great potential for land development, abundant water supplies, the excellent transportation facilities, and the progressive attitude of the people."

Harrisburg, a community of 1300, is one of two cities in Linn County to complete a "comprehensive plan." It is a highly industrialized area seeking opportunities for food processing. Agriculture has for years provided the economic base for the community, but since 1962 this base has been expanded to include

agri-business and manufacturing.

In Albany, Ellis Byer, manager of Oregon Freeze Dry, stated that their plant was constructed because of developing land resources, low-cost power, adequate available manpower, and the high quality strawberries that could be grown in the area. The company recently enlarged its operation to take advantage of expanded markets.

Albany Frozen Foods is another agricultural processing plant that recently expanded. Manager Glenn Graden says, "We have grown in size to meet expanding markets. The upper Willamette Valley has adequate soils and an abundant supply of quality irrigation water to produce the berry and vegetable crops we need to put out a good pack."

People working together

An RC&D Project is also people working together for a common cause. One example is the way the Linn County cities of Brownsville and Halsey planned together for industry and future growth when the American Can Company proposed building a \$40 million pulp and paper mill in the area. The plant, designed to produce 15 box cars of finished paper products each day and employ 450 people with

an annual payroll of \$4 million, went into full operation last September.

Halsey, population 450, has undertaken to provide adequate sewer and water systems in order to meet the anticipated expansion. The residents have approved a bond issue of some \$500,000 to develop a new sewer system and replace the old water system. The Soil Conservation Service and community development specialist of the Cooperative Extension Service have provided the Halsey Planning Commission with soil maps indicating suitabilities for various types of land use development.

Dick Manion, chairman of the Brownsville Planning Commission, says, "We have developed a new philosophy regarding industry since the coming of American Can. We feel this community of 980 people has great potential as a quality residential area to serve nearby development."

He goes on to say, "Yes, we want industry but we feel that retaining our environment is the first priority. We hope, as do other cities, that we can attract supportive industries and retain the livability of our environment."

The Brownsville Planning Commission is also using soil surveys and interpretations as a basis for development. Manion cites a recent example of a subdivider wishing to develop in the flood plain. "We will not approve this subdivision until the developer can assure us that adequate protection will be provided for the future residents."

Both Brownsville and Halsey are receiving professional planning as-

sistance by agreement with the Linn County Planning Department.

The pride of Lane County is Cottage Grove, recently named an All-American city. City Manager Larry Rice indicated that the community's comprehensive planning program played a significant part in winning this recognition, and the SCS soil surveys were an important factor in the plan. Surveys also helped in designating one large area as an industrial site.

A \$1½ million tourist complex is to be developed in the near future. An existing luxury motel hires about 150 people at peak operation, and these employees, primarily local people, return the earned dollars to the community.

The city has installed a tertiary sewage treatment plant—at this time the only one in Oregon. It has a long-range plan to acquire river frontage along the Coast Fork of the Willamette River and develop a greenway through the city and into the country. About half of the river frontage has been acquired.

The project sponsors have formed seven committees to plan for and carry out resource developments. The Woodland Committee has been active in developing the most efficient use of this valuable resource which occupies about 80 percent of the project area. More than half of the forest land is in private ownership and a good part of it is in the

hands of small woodland owners. Harold Sasser, farm forester for the State Forestry Department, is helping the committee plan for full resource development.

The Woodland Committee has been working to develop utilization of two major woodland products: (1) The small trees from private woodlots, and (2) Douglasfir bark, a byproduct of the extensive timber harvesting in the valley.

As a result, two industries have been established using posts and poles from commercial and pre-commercial thinnings for stand improvement. The posts and poles are being used on farms and ranches for farm buildings, vacation log cabins, pole corrals, fence posts, fencing along county roads and highways, and building rustic fences around country estates.

Earl Goodwin, owner of Small Tree Products, says, "There is a market and enough raw material for many businesses such as mine in the project area. Opportunities are almost unlimited."

Other industries are beginning to benefit from using Douglasfir bark, a byproduct long considered a waste. Researchers estimate that more than a million tons of this material has been going up in smoke each year in Oregon. In the project area more than ½ million tons of bark is produced annually. Project leaders have been meeting regularly with the Bark

Committee of the Eugene Chamber of Commerce to find ways of utilizing this "waste."

"Homeowners, landscape contractors, and nursery men seem to offer the best immediate hope for bark use," says Douglas Cruickshank, forestry marketing specialist of the State Forestry Department assisting the project.

"As a soil amendment, bark loosens the soil and aids in water retention. As a ground cover or mulch, it is decorative, discourages weeds, and keeps the soil moist." It is also being successfully used for coastal sand-dune stabilization, as a mulch in pear and peach orchards, for backfill in agricultural tile lines. Coarse or "rock bark" is protecting flowers and shrubs from jet blasts at the Eugene Municipal Airport.

Marvin Rexius of Rexius Fuel Service states that his business of collecting, sizing, processing, and distributing bark has increased 78 percent in 3 years.

"We have made considerable progress," says President Nash, "but there is a long way to go. We set our goals each year and readjust them to keep up with changing conditions and needs, and we take our coordinating role seriously. The Upper Willamette RC&D Project certainly cannot take credit for all the desirable activities going on, but it often serves as a catalyst to get needed developments moving." ♦

Such high value crops as beans are made possible by improved irrigation and flood prevention.



Extension agents help RC&D projects

To provide additional education assistance to resource conservation and development projects, the Cooperative Extension Service in 16 states has employed area resource development agents to work with county agents, RC&D project coordinators, and the local sponsors of projects. The program was initiated through a memorandum of understanding between SCS and the Federal Extension Service that authorized the transfer of SCS funds to that agency.

The Federal Extension Service makes allotments to the Cooperative Extension Service in states with RC&D projects in the operations stage. These allotments are based on project requests, plans, and available funds. During the initial 2 years of the agreement funds have been allocated to 20 states for educational activities on an area basis. The federal funds are often supplemented by state funds.

The area resource development agents work with county agents and others in providing groups and individuals with information on the RC&D opportunities in developing the natural resources within each project area. Although they still do some individual counseling, reports from the agents state that most of their work is with public officials, civic and service clubs, municipal and county governments, conservation districts, corporations, associations, and agricultural and governmental agencies.

Typical is a statement by James E. Summers, Salem, Mo., who is assisting the sponsors of the five-county Top of the Ozarks Rivers RC&D Project in south central Missouri. "My job is to work with local citizens in providing them with information and background needed to help them arrive at a decision." He also organized four short courses, attended by 175 people, last year to implement a project

measure of restoring section corners and section lines. University of Missouri specialists and the U. S. Forest Service assisted with an 8-hour course on land surveying.

Clarence R. Parker, Eugene, Oreg., in commenting on presenting a soil survey report at the Brownsville City Council and Planning Commission meeting, observed: "My role was principally one of encouraging the city council to take advantage of soil services available through the RC&D Project."

To benefit from group drains (a popular project measure in the Pri-Ru-Ta Project in northwest Wisconsin) affected landowners must cooperate. Area Agent Norman F. Kahl provided information on costs, organization, and alternatives for action. Several agencies cooperated

on this project measure; SCS providing technical assistance; Agricultural Stabilization and Conservation Service assisting with cost-sharing; and the Farmers Home Administration furnishing loans for land-leveling equipment.

David O. Dickens, county agent at Hamilton, Mont., reported, "It is often necessary to explain procedure and regulations of various programs to the people involved and assist them to study the alternatives to help them make decisions."

The Hunter Grazing Association of Corvallis, Mont., received information on range management, weed and brush control, and improving grasses.—HAROLD I. OWENS, *extension soil and water conservationist, Federal Extension Service, Washington, D. C.* ♦

Conservation Needs Inventory locates specialty crop areas

When the Southeast Kansas Food Industry Advisory Task Group recently sought information on growing specialized crops in nine southeast Kansas counties, the U.S. Department of Agriculture in Kansas was able to provide information on suitable soils from its latest Conservation Needs Inventory (CNI).

Working from the inventory data, five SCS technicians; an extension agent; a representative of Ozarks Regional Commission, an agency interested in economic development; a representative of Farm Products Management, Inc.; and Agri Business Systems Management Corporation had set up soil groups on which various specialty crops could be grown. Seven soil groups were given a rating of poor, good, or excellent for fruit trees, berries, or vegetables.

Land capability units were assigned to each of the general soils groups. From this information, the CNI revealed the potential for these specialty crops in the 3,390,000-acre area in the southeast corner of the state.

CNI figures showed about 161,000 acres of loamy lowland excellent for either fruit trees or vegetables; 186,000 acres of loamy upland rated excellent for vegetables; and 267,000 acres of moderately deep upland soils rated excellent for berries.

Task group chairman, Richard Liebert of Coffeyville, thinks the information will be useful in planning for production of these specialty crops.

Climate, markets, and special soil requirements of individual species are other considerations.

The Southeast Kansas Food Industry Advisory Task Group, appointed by Governor Robert Docking of Kansas, is sponsored by the Ozarks Regional Commission. This commission is a multicounty group in Oklahoma, Arkansas, Missouri, and Kansas created for the purpose of stimulating economic growth in distressed areas.—L. J. GASKELL, *district conservationist, SCS, Altamont, Kans.* ♦

Multipurpose ponds strengthen farm conservation program

Multipurpose farm ponds are the latest in a large number of soil and water conservation practices installed by the Westbrook family on their land in Ionia County Soil Conservation District, Mich.

One pond measures 275 by 60 feet and is 12 feet deep. With a ground-water source and a 30-acre watershed, it supplies water to another storage pond more than an acre in size. The ponds supplement a well capable of producing more than 300 gallons a minute for irrigation of 100 acres of beans and sweet corn. Three years ago Robert Westbrook and his brother Tom began irrigating a small acreage from a creek and soon learned the importance of a well-located central irrigation system.

The main pond is stocked with bass and bluegills, providing fishing and recreation. The farm ponds have replaced the "old swimming hole" and provide for the storage of nearly a million gallons of easily accessible water to help the entire neighborhood in case of an emergency.

In addition to the ponds, conservation practices on the 1,000-acre family farm include contour strip-

cropping, terraces, diversions, grass waterways, reforestation, and one of the better pasture improvement programs in the county. The pastures were seeded to alfalfa-brome 10 years ago and kept highly productive by proper management and proper fertilization.

Robert Westbrook was elected to the Ionia County District Board of Supervisors in 1959 and was named chairman in 1967. Under his leadership, the district has provided soil studies to two large cities and worked with villages on such projects as parks and water control for golf courses and schools.—GLENN A. CONVERSE, *district conservationist, SCS, Ionia, Mich.*

Michigan

Newcomer to Appalachia creates model tree farm

What happens when you give a Michigan Yankee a dose of southern sunshine, a smell of Tennessee River fishing, an eye-full of Appalachian mountain beauty, and a little southern hospitality? Well, in the case of Willis Russell, a Yankee immigrant to Meigs County, Tenn., he created a model tree farm.

According to Edd Norman, chairman of the Meigs County Soil Con-

servation District, "Russ has done more to promote good forestry management in Meigs County than anything since the Bowaters paper mill came to our community."

Russell owns 322 acres of woodland overlooking the Tennessee River. When he bought the land, it was covered with burned over black-jack oak, dogwood, hickory, and some pretty good shortleaf pine and white oak. His conservation plan includes tree planting, weeding, thinning, firebreaks, managed harvests, and Christmas tree production.

Russell has planted more than 50,000 pine seedlings. Some of this was underplanting to convert cull hardwood stands to pine. His goal is to have about 40 percent pure pine, 40 percent pure hardwoods, and 20 percent mixed forest. Russell says, "This way I am sure to hit some market—pulp, poles, or lumber."

Some of Russell's forestry pioneering is showing up in other parts of Meigs County. Since 1956, about 15,000 acres of idle land has been planted to trees. Twenty thousand acres of woodland has been improved and 50 miles of firebreaks have been built.

Russell has been able to take time out of his busy schedule to promote civic work in Meigs County. He served as chairman of the Meigs County Agricultural and Industrial Committee for 3 years. During his tenure, Meigs County obtained its first industry.—ERNEST H. WITAKER, *district conservationist, SCS, Decatur, Tenn.*

Tennessee

Director Westbrook at pond.



Tree Farmer Russell clears some brush.



His ranch plan tips the moisture balance

If this country got 2 inches a year less rainfall it would be a desert; if it got 2 inches more it would be lush with grass.

"We can make that 2-inch difference either way, depending on how we treat our land," says Montana rancher and conservationist, Kenneth Coulter.

Coulter makes the difference in the right direction by practicing conservation on his 3,200-acre ranch near Brusett as a cooperator with the Garfield County Soil and Water Conservation District and a participant in the Great Plains Conservation Program.

Since 1958 he has been chairman of his district's board of supervisors, and presently he is a director of the State Association of Soil and Water Conservation Districts.

His 1966 Great Plains contract called for installing three cross-fences totaling 590 rods, spraying 280 acres of sagebrush, seeding 112 acres of rangeland, drilling a stock-water well and adding a pipeline, planting 37 acres of hayland, and building a diversion to protect a wheatfield. He has since modified the plan.

The payoff is evident in his calf and lamb crops. In 1968 his Hereford calves averaged more than 500 pounds when sold in November at 6

Irrigator Metzker in alfalfa.



months' age. They received no supplemental feed. His lambs weigh more than 100 pounds.

His is one of 284 ranches now operating in an area of more than 3 million acres that was a thriving farm area before the droughts of the 1930's.—JOHN E. MOONEY, *district conservationist, SCS, Jordan, Mont.*

California

Conservation irrigation provides winter feed

A new source of winter feed for neighboring dairy farms was made possible by a soil and water conservation program on the Kermit Metzker farm at Montague in northeastern California.

Metzker's ranch is in a 6- to 10-inch rainfall area where he raises livestock grain and forage for feed. Originally his land produced a crop of dryland grain every other year. A thousand pounds of dryland alfalfa was all that could be produced without irrigation.

Cooperating with the Shasta Valley Soil Conservation District, Metzker developed and applied a conservation plan which included leveling the land to a uniform grade for flood irrigation. He installed parallel border checks 33 feet apart in the direction of irrigation, enabling him to control water application effectively. He planted a permanent hayland mixture of Ranger alfalfa and intermediate wheatgrass to be harvested for hay.

Metzker says, "This ranch is now productive and easy to operate. It will pay for the investment in 2 years.—DAVID L. CURTIS, *soil conservationist, SCS, formerly of Yreka, Calif.*

Nebraska

Pooling agreement aids in floodwater control

A Great Plains pooling agreement provides for the control of floodwaters from a 1,560-acre drainage from the Wildcat Hills escarpment in Banner County, Nebr.

This agreement resulted from the request of three district cooperators, Charles I. Anderson, Neta Olsen,

and Fred Lars Johnson, owning 1,840 acres of land, for group assistance from the Banner County Soil and Water Conservation District to control the floodwater that had been depositing silt, gravel, and rocks onto their fields and flooding the Johnson farmstead. Several neighbors downstream will benefit from the group project.

The landowners agreed to pool specified cost-shares from their Great Plains contracts and to pay a prorated part of the cost of solving their common problem.

The Soil Conservation Service made the surveys for two floodwater dams and a mile-long grassed waterway. The larger dam, approved by the Nebraska Bureau of Water Resources, will be 676 feet long and 34 feet high with 168 acre-feet of storage. A smaller dam $\frac{1}{4}$ mile down the draw will catch water from 240 additional acres of drainage and will provide 50 acre-feet of storage. The dams, waterway, and exposed borrow and spillway areas will be seeded to native grasses and mulched with prairie hay. The grassed waterway will carry water from the trickle pipe and excess floodwater from the emergency spillway.

Also included in the pooling agreement is a mile-long field diversion to protect 400 acres of cropland below the escarpment and divert the runoff water behind the dam.

In addition, practices on the three individual farms include building a total of 77,000 feet of level terraces, contour stripcropping 396 acres of sloping cropland, seeding 30 acres of steep cropland to native grasses, and developing one spring for livestock water.

When the group detention dams are built, LeRay Edens, a Great Plains cooperator with a 1,200-acre farm immediately down the draw, plans to build a grade stabilization dam to control a 12-foot overfall that continues to eat back into his cropland despite extensive conservation work already done on his land.—DAVID K. RICE, *district conservationist, SCS, Harrisburg, Nebr.* ♦

Laboratory helps keep rural charm

The town of Stow, Mass., has set aside a 4-acre tract of land for use as an outdoor laboratory to be known as the "Stow Outdoor Classroom." It is a byproduct of a soil survey with urban interpretations and a natural resources inventory which Stow obtained in an effort to grow and still preserve the town's rural charm in the face of population growth.

Stow Outdoor Classroom, developed by the Liberty Council of Schools, the Middlesex Conservation District, and the Massachusetts Audubon Society through a grant from the Department of Health, Education, and Welfare, includes trails, a bridge, and a boardwalk built with help from the Boy Scouts. A pond was constructed on adjacent publicly owned land from designs by the Soil Conservation Service.

Trees and shrub plantings are being added, and the areas's cover abounds in ferns, skunkcabbage, ladyslippers, wild geraniums, mountain laurel, blueberries, and other wildflowers and native shrubs.

The underlying theme of the classroom is "The Relation of Man and the Land." First planned for pupils of grades one through four, English classes now make trips and write compositions about the outdoor classroom, and the art classes find nature subjects in their natural setting. Science classes have taken pond water samples indoors for study, and small horned pout and crawfish are kept in fish tanks.

This outdoor classroom has been a model for several similar projects in other towns. Warren M. Little, director of the Nature Center, looks forward to an ever-expanding use of Stow's Outdoor Classroom.—WILLIAM H. COATES, *assistant state conservationist, SCS, Amherst, Mass.* ♦



Teacher Hunt identifies trees and shrubs for the 5th grade class of the Hale School.

Children return to wildlife area

School children of Wirt County, W. Va., this fall are seeing the results of wildlife habitat plantings they made last spring on the Hughes River Public Hunting Area — a 10,000-acre tract of timberland owned by the Westvaco Corporation near Elizabeth.

Groups of fourth and fifth graders from elementary schools in (six towns and communities) visited the forest during 6 days of field sessions and tours in May when the children planted seeds and shrubs for wildlife food, hiked along nature trails, and identified wildflowers and trees. They also marked den trees that birds and animals might use for shelter. Instructors have planned the fall return trip as a continuation of outdoor experiences to give the students a broader understanding of the meaning and benefits of conservation. The series of conservation classes was sponsored by the Little Kanawha RC&D Project.

Representatives of the Westvaco

Corporation, West Virginia Department of Natural Resources, West Virginia University Extension Service, Pace Education Center, SCS, and the Wirt County Board of Education are working with students, teachers, and principals on further plans for conservation studies in the area.

Similar programs are being planned also for other schools within the Little Kanawha RC&D in Ritchie, Roane, Calhoun, and Wood counties.—ARUN C. BASU, *area extension specialist, West Virginia University, Morgantown, W. Va.* ♦

Detroit now in soil conservation district

Detroit, Mich., the Nations fifth largest city, is now part of a soil conservation district formed to help alleviate resource problems that occur in an area of rapid land use changes.

Assistant Secretary of Agriculture Thomas K. Cowden has signed a working agreement with the newly formed Wayne Soil Conservation

District. It authorizes appropriate technical and financial aid for the district from the U.S. Department of Agriculture and from state and local sources.

Wayne County, whose boundaries coincide with the new district, is one of the fastest growing areas in the Nation. Approximately 1,000 farms, most of them small, are still operating in the area. But rapid urban growth has created complex erosion and flooding problems, as well as a decrease in land used for agriculture and an increase in idle land held for development.

Local sponsors say the problems of flooding, drainage, pollution, and sediment control will be major concerns of their new soil conservation district. ♦

Symposium on Manmade Lakes being organized

An International Symposium on Manmade Lakes, Their Problems and Environmental Effects will be held at Knoxville, Tenn., on May 3-7, 1971. The conference should be of interest to a broad range of scientists, engineers, and project managers.

The conference is being organized by the Scientific Committee on Water Research (COWAR) on behalf of the International Council of Scientific Unions (ICSU). Numerous unions and committees of ICSU are cooperating, and agencies of the United Nations are providing support. Arrangements in the United States are by the National Academy of Sciences and the Tennessee Valley Authority.

The symposium will assess recent findings, summarize knowledge, and point to needed research on man-made lakes.

Inquiries regarding attendance and participation should be addressed to: Prof. William C. Ackermann, president, Scientific Committee on Water Research, Illinois State Water Survey, Box 232, Urbana, Ill. 61801. ♦

Meetings . . .

Manufacturers study priorities for 70's

"Priorities for the 70's" will be the theme of the 1969 annual meeting of the Congress of American Industries, National Association of Manufacturers, to be held in New York City, December 3-5.

A session on urban priorities will include presentations by the Secretaries of Labor, Housing and Urban Development, and Health, Education, and Welfare. The subjects to be discussed in other sessions include "Campus Unrest," "Technological Development for National Defense," "Collective Bargaining," "Implications of Wage Price Control," "Contributions of Business Methods to the Public Education Process," and "Impact of Technology in the Next Decade."

Economics Society considers changes in agriculture

The American Agricultural Economics Association will hold its winter meeting in New York City on December 27-30, meeting jointly with the Allied Social Science Association. Sessions will include presentations and discussions of "Micro Simulation Models," "Current Economic Policies," "Meeting the Changing Need for Agricultural Statistics," "Social Change in Public Policy in Rural America," "Data and Research Needs for the 70's," and the "Changing Structure of Agriculture and its Statistical Needs."

Man and technology concern of science groups

The American Association for the Advancement of Science will hold its annual meeting in Boston, Mass., December 26-31.

Some of the topics in the general symposia include "Arms Control

and Disarmament," "Technology Assessment and Human Possibilities," "Science and the Future of Man," "World Order and the Technological Revolution," "Hunger and Malnutrition," "Is There an Optimum Level of Population?," and "Rational Use of Water."

Other topics will be discussed in the committee and section symposia.

Tours will be to the Worcester Foundation for Experimental Biology, New England Aquarium, Cambridge Electron Accelerator, several museums, Woods Hole Oceanographic Institution, Marine Biological Laboratories, U.S. Bureau of Commercial Fisheries, and the Massachusetts Institute of Technology and the Harvard University.

Dates and places

December 1-5, National League of Cities, San Diego, Calif.

2-5, Western Forestry and Conservation Association, Spokane, Wash.

3-5, Congress of American Industries, NAM, New York, N. Y.

8-11, American Farm Bureau Federation, Washington, D. C.

9-11, Annual Corn and Sorghum Research Conference, Chicago, Ill.

9-12, American Society of Agricultural Engineers, Chicago, Ill.

26-31, American Association for the Advancement of Science, Boston, Mass.

27-30, American Agricultural Economic Association, New York, N. Y.

January 1970

13-14, National Council of Farmer Cooperatives, Hollywood Beach, Fla.

14-17, Garden Seed Conference, New Orleans, La.

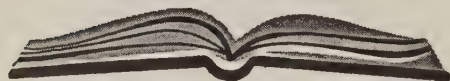
21-24, National Wool Growers Association, Denver, Colo.

24-28, American National Cattlemen's Association, Washington, D. C.

26-30, American Society of Civil Engineers, Water Resources Conference, Memphis, Tenn.

RC&D Project expands to include more counties

The Box Elder Resource Conservation and Development Project in Utah has been expanded to include Cache County, Utah, and Oneida County, Idaho. The new areas add 1,514,240 acres to the project's original 3,474,606 acres in Box Elder County. ♦



The Subversive Science: Essays Toward an Ecology of Man. EDITED BY PAUL SHEPARD AND DANIEL MCKINLEY. 1969. Houghton Mifflin Company, Boston. 453 pp., illus. \$8.95.

Start with an intriguing title and add a collection of 3 dozen essays which consider man within and as a part of the natural environment and you have a varied assortment of ideas calculated to delight some readers and infuriate others.

There are a good many well-known names among the authors: Paul Sears, Alan Watts, Rene Dubos, Ian McHarg, Lynn White, and Jacquetta Hawkes. The title of the book is taken from Paul Sears' "Ecology—A Subversive Science" published in *BioScience* in 1964, in which he explored the question of ecology as a science of limited interest as opposed to ecology as an instrument for the long-run welfare of mankind which might endanger the assumptions and practices accepted by modern societies.

Paul Shepard elaborates on the theme in his introduction: "The ideological status of ecology is that of a resistance movement . . . They (the ecologists) challenge the public or private right to pollute the environment . . . they oppose the uninhibited growth of human population . . . the extinction of species of plants and animals . . . the domestication of all wild places."

Essentially, the writers selected for this collection of essays are saying that we must shift our whole frame of reference and our attitude towards life itself to acquire the humility to accept our place in nature, instead of regarding nature as either natural resources or scenery, "the great stereotypes in the minds of middle class, college-educated Americans."

Some readers will undoubtedly

consider this philosophy just another man-in-nature mystique; others will find it a mind-stretching experience of varied intellectual encounters. It will delight those who say with St. Francis "... our mother the earth which doth sustain and keep us and bringeth forth divers fruits and flowers of many colours, and grass . . .". The rest it will probably bore to extinction.—KATHERINE N. MERGEN, *Information Division, SCS*.

New publications

Water Use: Principles and Guidelines for Planning and Management in Wisconsin. EDITED BY RUTH L. HINE. 1969. *Water Use and Planning Committee, Wisconsin Chapter, Soil Conservation Society of America, P. O. Box 5155, Madison, Wis. 53705.* 96 pp., illus. Free on request. This bulletin provides an overview of the current status of Wisconsin's surface and underground waters, their major problems of quantity, quality, and use, and the principles and guidelines being designed and used to advance management in the public interest.

Although pertaining specifically to Wisconsin's resources and problems, it presents much general information of wide application and the "additional sources of information" given at the end of each section would be helpful in any similar study elsewhere. The subjects treated are: Surface waters, wet lands, Great Lakes, ground water, river basins and watersheds, flood-plain management, shore-land management, and water-quality standards.

Land Tenure in the United States; Development and Status. By D. DAVID MOYER, MARSHALL HARRIS, AND MARIE B. HARMON. 1969. *USDA Agr. Inf. Bul. 338.* 38 pp., charts. \$0.50. An overview of the origins of the United States land-tenure system and information on its current status, with major attention to agricultural land, including that used for grazing and forestry. The data are drawn mainly from the 1964 Census of Agriculture.

Land tenure is concerned with the many relationships that govern access to and use of land resources and claims on goods and services that flow from them. Farm tenures are classified in four major groups—full owners, part owners, managers, and tenants.

Significant adjustments in recent years have seen an increase in proportion of farm operators who are part owners and a decrease in those who are full tenants. Concurrently, there has been

a doubling of size of farms between 1940 and 1969 among all tenure groups in all major sections of the country.

Water Pollution Aspects of Urban Runoff. BY AMERICAN WATER WORKS ASSOCIATION. 1969. *U.S. Dept. Int., Water Pollution Control Research Series WP-20-15.* 272 pp., illus. Report of a study carried out under contract with the Federal Water Pollution Control Administration. The amount of street litter deposited from various sources, and picked up by storm waters, averaged 4.7 pounds per 100 feet of curb per day in commercial areas and 2.4 pounds in single family residential areas. It included debris dropped by people and washed from yards and open areas, building and demolition wastes, materials eroded from pavements, fecal droppings from animals and birds, fallout of air pollution particulates, and dust and dirt blown by winds.

Recreational Use Patterns at Flaming Gorge Reservoir, 1963-65. BY JOHN G. HEWSTON AND DONALD R. RANKLIN. 1969. *U.S. Dept. Int. Resource Publ. 70.* 80 pp., illus. \$0.75. Results of a study carried out by means of interviews, questionnaires, and observation by the Bureau of Sport Fisheries and Wildlife and the Utah Cooperative Fishery Unit at Utah State University. The number of visits increased from 231,065 in 1963, the year the reservoir began to fill, to 786,103 in 1965. In 1963, 56 percent of the parties came primarily to sightsee, but fishing became the most important primary purpose in the following 2 years.

Outdoor Recreation and Leisure. BY JAMES R. AND MARJORIE J. PINKERTON. 1969. *University of Missouri, Columbia.* 332 pp. \$4.50. A reference guide and selected bibliography.

The Appalachian Land Stabilization and Conservation Program. 1969. *USDA, PA-898.* (12 pp.), illus. \$0.10. A simple explanation of the program.

RC&D Project to improve living standards

A six-county RC&D Project in north-central South Carolina has become eligible for accelerated financial and technical aid from the Department of Agriculture.

The Crossroads of History Resource Project is the 45th local action group to qualify for operations assistance from USDA agencies.

Counties included in the South Carolina RC&D Project are Cherokee, York, Union, Chester, Lancaster, and Fairfield. ♦

Another look at our resources

The Nation's first appraisal of needed soil conservation work was the "reconnaissance erosion survey" completed in 1934, by the newly created Soil Erosion Service, predecessor of the Soil Conservation Service.

The new agency, then in the Department of the Interior, did not have personnel nor funds for making a detailed survey. Nevertheless, its fieldworkers covered each state, county by county, in 2 months and mapped general erosion conditions.

The results of this survey, sketchy as it was, startled the Nation and set a new course for the conservation movement. Its results were quoted far and wide. One fact still stands out "that 60.9 percent of all cropland is either subject to continued erosion under current practices or is of such poor quality as not to return a satisfactory return at the price levels assumed."

The effect of that reconnaissance survey on the Government's soil and water conservation policies will be felt for generations. For more than a decade it provided the only real basis for judging erosion and land conditions in the Nation.

In 1945, SCS published "Soil and Water Conservation Needs Estimates for the United States" based on a study started in the fall of 1942. For the first time conservation work was related directly to land-capability classes, a system that only a year or two before had been initiated to help make soil conservation more meaningful to the land owners and users who had to put the conservation work on the land.

It was not until 1957 that local people in every county joined with the Department of Agriculture to study data from soil surveys and sample areas for the purpose of compiling a National Inventory of Soil and Water Conservation Needs. More than 30,000 people in 3,000 counties participated.

The results were unique in soil survey and land use statistics. This was the first time we ever had consistent statistical sampling of the soil, slope, and erosion conditions in every county in the country. It was the first time that all creek-size watersheds had been delineated and their problems enumerated.

Ten years later, this work is continued and refined in the current updating of the Conservation Needs Inventory. Conditions are changing so fast that we cannot stop for a moment in our efforts to learn all that we can about the Nation's soil and water resources. We must have up-to-date information to guide public policy in the conservation and development of resources to meet the needs of the people.

The demand for information about our resources far transcends what was needed in that first survey in 1934. While we were concerned then about food production, about controlling duststorms, about gullies—and I do not minimize these things even today—we are now faced with monumental problems of total land use by county planning commissions and by zoning boards; by the great need to make efficient use of land everywhere; by the need to set aside good farmlands lest they be covered with concrete; and by the responsibility that this Nation has to preserve some breathing space for the generations to come.

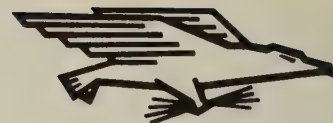
Let us make use of this valuable fund of information in our own work as conservationists and make it fully available to those people who must make decisions affecting land use policies. Let it be used to help solve the conflicts between agricultural and industrial needs, between utilitarian and esthetic considerations in resource use. And let us continue to improve the information to meet tomorrow's problems arising out of still further changes in the Nation's needs for land-resource use.

Kenneth E. Grant

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36 percent of nonfederal land is adequately treated for conservation

Preliminary report on pages 99-109



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Grassland conservation,
livestock, and wildlife

SCS activities 1969

Soil Conservation Service
U.S. Department of Agriculture

Soil **Conservation**

Devoted to the wise use of land and water resources



Now that ecology is the byword of conservationists, both practicing and professed, SCS range scientists find themselves veterans amongst a company of newcomers.

The example (p. 123) reported by Texas Rangeland Rudy Pederson and Biologist James Henson illustrates how SCS's practicing ecologists have helped ranchers understand the complex life systems of brushy ranges and fashion programs of multiple use that produce both native wildlife and domestic livestock.

Idaho Conservationists Neal Bue and John Davis give us another example (p. 128) in an arrangement between a sheep ranch and the state game department to improve the range while accommodating a growing winter elk herd.

And economics

Grazing associations in many places have enabled ranchers to combine sound economics with efficient grass management to create profitable operating units, often under difficult circumstances. Fieldmen from Montana (p. 127) and North Dakota (p. 129) report on two pioneering examples.

Human environment

Ecology and economics are joined in the increasing emphasis by SCS on improving the quality of human environment by means of authorized soil and water conservation programs. Our annual summary of activities (p. 135) reflects a growing involvement during fiscal 1969 with community and regional land use planning and economic development through the use of land-resource data.

COVER: Good cattle on good grass are a delight to the ranchman's eye and a testimony to good range management in the Elk Creek Soil Conservation District, S. Dak.



Soil Conservation

Devoted to the wise use of land and water resources

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

CLIFFORD M. HARDIN, Secretary of Agriculture
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Sound range management benefits landowners, hunters, and more than 3 million whitetailed deer in Texas. The promise of extra income encourages many ranchmen to provide for deer as well as for domestic stock. Wild turkeys, quail, and other wildlife also thrive in the improved habitat.

Rangelands are the primary source of forage for livestock and big game on approximately 60 million acres in Texas. Although deer and other native wildlife belong to the state, they graze on privately owned lands.

Most ranchers realize that each day an adult deer consumes about as much forage as a sheep or goat (about 4 pounds). The 3.2 million deer in Texas remove more than 12 million pounds of forage daily— forage that could otherwise be utilized by cattle, sheep, or goats. With this in mind, landowners turn deer to economic value by offering hunting leases for sale.

Multiple use of rangeland for livestock and game production has become big business. By charging for the privilege of hunting on their lands, ranchers capitalize on forage consumed by wildlife. Gross income from hunting leases in Texas

is estimated to be more than \$17 million annually. In 1968 approximately 33 million acres was leased for deer hunting, and 280,000 deer were harvested.

Conservation plans developed and applied by landowners with help from the Soil Conservation Service include grazing management and conservation measures to (1) improve range for livestock and (2) enhance wildlife and recreational resources. Management decisions are based on analysis of costs and returns of alternative approaches in relation to the available range and wildlife resources in each case.

Deciding on the number of grazing animals to be stocked is one of the operator's most important tasks each year. It is essential that livestock and deer populations be balanced with available forage.

In years of low forage yield, ranchers can cull breeding herds, sell calves and lambs early, and otherwise vary livestock numbers to adjust the grazing load on ranges.

Deer are not so easy to manage. Starvation during drought some-

Managing rangeland for wildlife and livestock

**By Rudy J. Pederson and
James Henson**

*Range conservationist and biologist, SCS,
San Angelo, Tex.*

*Deer and wild turkey thrive where
good range management is
practiced in the Texas brush
country.*





Too many deer, sheep, and goats in the same pasture strip all foliage from oak brush as high as the animals can reach and lay the soil bare to erosion.

times reduces deer numbers more than desired. Conversely, when food is abundant and other environmental factors are favorable, herds may increase as much as 50 percent in a year. Normal increase of most Texas deer herds is in the range of 15 to 40 percent.

Research shows that about 25 percent of a healthy deer herd should be harvested annually. Unless hunting is concentrated on the annual population increase, the reward for good management may be forfeited. Deer cannot be stockpiled; any excess over carrying capacity will be lost to starvation, disease, or natural predators.

A sound hunting enterprise that accounts for the annual increase helps to reduce peaks in the "boom and bust" cycle. This means more forage for each deer; better reproduction; and larger, healthier, trophy-type deer. The average hunter, however, is often reluctant to take antlerless deer as part of his quota. The type of hunting lease thus becomes an important part of range

management programs designed to balance forage and consumption.

A unique leasing arrangement works well for Mr. and Mrs. Gilbert Anderegg, cooperators in the Upper Llanos Soil and Water Conservation District on the Edwards Plateau.

Rather than offer a conventional lease to one group of hunters for the entire season (usually about 47 days), the Andereggs allow each of three different groups to hunt deer and turkey for about 2 weeks. Between each period, the ranch is not hunted for several days while the game "settles down" to normal routine.

"We took in \$3 an acre from hunting leases last year on our ranch," the Andereggs reported. "This type of leasing arrangement not only produces additional income but also allows the harvesting of more deer and turkey."

Kinds of livestock

When deer are desired, correct livestock selection is important. Deer preferences for long, narrow pastures stocked at varying rates with different kinds and combinations of livestock have been observed for many years by Leo Merrill, superintendent of the Sonora Experiment Station Ranch. He notes that:

(1) Deer are rarely seen on pastures that are continuously and heavily stocked with sheep, goats, and cattle, or where sheep are moderately or heavily stocked.

(2) There are few deer in pastures stocked heavily with goats only.

(3) Deer are most abundant and consistently seen in pastures with (a) no livestock; (b) light stocking; (c) goats moderately stocked; (d) cattle only; (e) cattle, sheep, and goats grazed in a four-pasture rotation deferred system.

Livestock compete with deer for forage if the range is heavily grazed. Competition sets in early and is more severe where sheep and goats are grazed. Deer may not sur-

vive because they are unable to alter their diet of forbs, browse, tender grass, and mast. Livestock can utilize lower quality dry roughage.

Brush management

Like many other deer managers, the Andereggs improve hunters' chances by removing excess brush and creating openings. Thousands of brush-infested acres throughout the state have been treated mechanically or chemically to control woody plants and restore grass and forb production. Landowners who control brush plan these measures to retain or improve deer habitat.

Although deer use open grasslands and cleared areas, they seldom stray far from the protective cover of standing brush. Factors such as topography and kinds and density of brush must be considered while determining the amount of woody cover necessary to sustain deer without hindering hunters.

In general, high populations can be maintained under hunting pressure when 25 to 35 percent of the land is left in brush. This cover must be properly distributed. For example, Anderegg alternates strips and blocks of controlled brush with uncleared areas. He also leaves brush along drainageways, on steep slopes, and on less productive soils.

Resting pastures benefits rangeland and means more forage for game animals in critical times. Deer are frequently seen moving into rested pastures. Hunting is easier when pastures are rested before and during the shooting season.

On the Anderegg ranch, sheep and cattle are grazed in rotation so that at least one-half of the range is being rested at any time. Anderegg sold his goats to permit better browse growth for deer. But that's a small sacrifice for the success of the couple's overall program.

"We're convinced that our multiple-use approach to range management has benefited wildlife as well as our grasslands and livestock," the Andereggs said. ♦

Pasture for profit

Indiana cattlemen spur effort to increase forage and beef production in Lincoln Hills

By Roy E. Hamilton and J. V. McDonald, Jr.

Conservation agronomists, SCS, Indianapolis, Ind., and Albuquerque, N. Mex. (formerly at Cannelton, Ind.)

Soil, grass, livestock, people—these are the ingredients.

Conservation, beauty, prosperity—these are the results.

A program to improve grassland and livestock in southern Indiana's Lincoln Hills Resource Conservation and Development Project is the means of bringing the ingredients together in a way to get effective results.

Farmers in the Lincoln Hills have long known that most of their soils have limitations for cropland use and cannot match Indiana's reputation as a Corn Belt state. Instead of broad, level farms, most of the area northward from the Ohio River through Harrison, Crawford, Perry, and Spencer counties is sharply rolling and broken only infrequently by productive bottom lands.

When the local sponsors, aided by agency specialists, were fashioning the RC&D proposals, one of the original working groups was a

committee to help accelerate the region's forage and livestock development.

The goal of the 18-member group was to create more local income through intensive management of forage and livestock resources. Specifically, their objectives were:

- development of an intensified forage production and utilization program.
- development of livestock management and breeding practices to improve conversion of forage into income.
- development of high quality, standardized livestock.
- development of general interest in the Lincoln Hills livestock-forage program.

The Soil Conservation Service and the Extension Service helped farmers establish new pastures and improve old ones, and the Agricultural Conservation and Stabilization

Service shared the cost through its regular ACP and special programs. In 1965 and 1966, the Office of Economic Opportunity paid the salary of an Extension Service forage-livestock specialist who assisted low-income farmers with livestock management, disease control, and performance testing. Since 1967 the Soil Conservation Service has provided a conservation agronomist to assist the sponsors of the Lincoln Hills Project.

Working examples

For years, Livestock and Forage Committee Chairman Bill Boldt's farming operation has exemplified good forage management, conservation, efficient livestock production, and sound breeding practices. His 455-acre Harrison County farm, overlooking scenic Blue River, has belonged to the Boldt family since the Civil War. With one-fourth of his farm in orchardgrass and ladino

Improved pastures, like William Freeman's farm near Tell City, Ind., mean improved cattle, improved income, and ultimately an improved Lincoln Hills.



clover, he markets feeder calves and pigs each year for top market prices—the best demonstration that good management produces good results.

Boldt's confidence in traditional forage varieties, such as orchardgrass, tall fescue, ladino, and medium redclover, hasn't kept him from searching for other improved varieties. He plans to overseed one fescue pasture to sericea lespedeza. He has seeded crownvetch in another small pasture and planted 4 acres for seed production. Elsewhere, he has established trial plantings of zigzag clover and common bermudagrass.

In Spencer County, Thomas Drury has 20 acres of common bermudagrass that was seeded many years ago by Southern field-hands who lived on the place. When Drury purchased the farm in 1950, he overseeded the bermuda with ladino clover and now stocks the pasture with a cow to the acre from June until frost.

Lincoln Hills farmers have planted several pastures to this grass, having discovered that it grows vigorously while some other cool-season grasses are nearly dormant. Bob Walton, a Crawford County dairyman, has a wet bottom-land field that has been in Reed canarygrass since 1945. He uses it for hay, haylage, and grazing. According to Walton, it responds well to nitrogen fertilizer and out-produces all other varieties in summer.

New techniques

Increasingly, Lincoln Hills livestock operators are taking advantage of surplus forage in the peak growing season by making hay, haylage, or by "haying" the standing grass later. Willis White and Floyd Allstott, Crawford County beef cattlemen, are among those who recently bought round hay balers to make their haying operations easier.

White says that by baling his fescue and leaving it in the fields, he reduces the labor of winter feed-

ing and also makes hay available during summer droughts. Both White and Allstott plan to strip-graze fields with the round bales of fescue. With electric fencing, they enclose a month's grazing at one time and rotate the pasture by increments, thus reducing wastage of hay during the winter months.

Clarence Kaiser, Crawford County Livestock-Forage Committeeman, district supervisor, and registered Charolais breeder, has another outstanding example of sound forage management. His grassland conservation program has been studied and copied throughout the Lincoln Hills area. The two most important things in pasture management, Kaiser says, are to avoid grazing the grass too short, and to rotate livestock between pastures so that each pasture has a definite rest period between grazings. His farm is a virtual experiment station, now testing big trefoil, zigzag clover, crownvetch, bermudagrass, and six strains of alfalfa.

Valuable contributors

Adjacent to the Lincoln Hills area in Dubois County is the Southern Indiana Purdue Agricultural Center Forage Farm, which has given major assistance to farmers in improving their forage and livestock operations. The center was established in 1953, at farmers' request, to serve as a research station on hill-land fragipan soils. It recently held two field days for Lincoln Hills farmers which attracted large crowds.

After 5 years, the results of the RC&D effort are confirming the hopes of project organizers. For example, more than 28,000 acres of pasture has been established or renovated, including a large acreage converted from other uses. More than 10,000 acres of pasture was "properly managed" for the first time last year.

At the Spring Feeder Calf Sale, operated by Producers Marketing Association at Milltown, 625 calves

were sold for \$87,924.36. Beef cattle numbers increased 23 percent between 1967 and 1968.

The Livestock and Forage Committee is now undertaking three RC&D Project measures to obtain better marketing and production practices: (1) To determine interest in organizing a grazing association, (2) to inventory cow herd producers and determine the type of market they would support, and (3) to determine desire for more personal assistance in production and marketing. ♦

Soil mapped for planning Detroit expansion

Preparation of a general soil map of a seven-county area in southeastern Michigan was one of the first steps in a comprehensive regional plan for controlled development. Soil survey results were incorporated in intensive studies of transportation and land use around metropolitan Detroit, undertaken by the Southeast Michigan Council of Governments. Planners have laid out desirable expansion patterns designed to accommodate an additional 2 million people by 1990 without wasting open space or utilizing unsuitable soils. ♦

Colorado 21st state covered by updated programs

Colorado has become the 21st state in which all local soil and water conservation district programs have been updated to fit today's broad needs.

Assistant Secretary of Agriculture Thomas K. Cowden has signed a new memorandum of understanding with the Stonewall Soil Conservation District in Las Animas and Costilla counties on the basis of its new long-range program. The agreement with this district completes the updating of district programs in the state. ♦

It's hard to believe even after 5 years, but 11 Montana farmers still say they bought a 28,000-acre ranch for \$5 each.

There's more to the story, of course, but their venture is demonstrating how the growing number of ranching cooperative or grazing associations are opening up new opportunities for men whose only shortage is money.

Around Sidney, Mont., nature is harsh and difficult—extreme climatic variations in temperature and rainfall, rugged badlands, remote and undependable watering places for livestock, difficult roads, and limited communications. Even so, with proper handling this still-new land almost astride the North Dakota line can produce lush summer grass, handsome livestock gains, and prosperity in an otherwise distressed economy.

Natural hardships

For years, Karney Redman, owner of the 28,000-acre Smith Creek Ranch south of Sidney, observed the region's economic difficulties and shared its hardships. As an example of the range conditions he faced, only one-third of his grassland could be grazed because the remainder had no water and lay beyond the traveling distance of livestock. Rambling Smith Creek, three wells, and one dam supplied all stock water but frequently went dry during droughts.

Between the Yellowstone River, which borders the west end of the ranch, and its eastern boundary lies some 45 square miles of Montana's most rugged badlands, criss-crossed by deep canyons and coulees interlacing thousands of acres of high escarpments and scarcely-touched sod. Even with good grass, Montana badlands offer practically no hay harvest, minimal winter grazing, and nearly impossible travel for man and animal alike. Only one road, impassable much of winter and after rains, gave access to town and schools 28 miles away.

In 1963, Redman became a

Badlands grazing venture typifies success of grazing associations

By Walter Anderson, Dean Davidson, and Clayton Ogle

District conservationist, SCS, Sidney, Mont.; chief of community services, FHA, and state resource conservationist, SCS, Bozeman, Mont.

cooperator with the Richland County Soil and Water Conservation District and with the aid of Soil Conservation Service conservationists began an inventory of his Smith Creek range resources. They surveyed the ranch and discovered several natural springs, sites for wells and dams, waterspreading systems, natural barriers, and sites for cropland. They made estimates on the cost of the projected improvements, stocking rates before and after development, and other details involved in a complete conservation plan for the property. Redman signed a Great Plains Conservation Program contract and began making the scheduled improvements with cost-share assistance.

Meanwhile, Redman gathered neighboring farmers to form the first grazers association with a Montana Grazing District. The organization completed, the 11 members paid a membership fee of \$5 each. Then the Farmers Home Administration approved their loan request for \$265,000, and the group held title to Redman's 28,000-acre Smith Creek Ranch.

Between the 1963 application and 1964 approval notification, Redman pushed his Great Plains Program forward and installed about half the proposed watering places. The grazing association took charge only days before a violent rainstorm hit the ranch and washed out miles of hard-earned fences and four costly dams.

Immediately, the group set out to repair the damage. Today, the work is nearly completed. Three wells, seven dams, and one spring development have been completed. Two wells have been rebuilt, all fencing

has been completed, and all old fences and washed-out dams have been repaired. The 250-acres of grass-seeded cropland is now a good native pasture.

A grassland management plan, reviewed annually by the directors, assures proper use of all the range. After 4 years, during the summer of 1969, livestock on Smith Creek Ranch had 40 percent more grazing than before improvement.

Investment figures

Tallying their figures, the ranchmen found the cost of work under the Smith Creek Ranch's Great Plains contract totaled \$23,120. Great Plains Conservation Program funds cost-share \$14,500 of this total. The rancher's share is \$8,680. An additional \$8,700 in Federal cost-share funds came from the Agricultural Stabilization and Conservation Service through its flood-restoration program.

Presently, each animal-unit-month of grazing costs the ranchers \$3.58, including operation and maintenance of the ranch, interest, principal payments, and payment to a sinking fund. In 1968, income from grazing fees was \$26,000. Operating expenses amounted to \$8,950, not including interest and principal. To date, the group has paid \$62,284 against interest and principal, paid off \$10,415 of the principal, and accumulated a reserve fund of \$6,444. All grazing fees are paid and no other indebtedness has been incurred.

Smith Creek Ranch? Now, it has good grazing, good water, and a good living for each owner. The grazing association concept has proved so successful, in fact, that

today 28 additional grazing associations have been organized in Montana and four more are being formed.

Others follow

On the State scorecard, more than 400 Montana ranchers have used USDA's loan, cost-share, and technical assistance to purchase, improve, and manage grazing land. They have bought or are buying some 322,000 acres of private ranchland and adding grazing permits on some 284,000 acres of federally owned land. Government agencies managing the federal land have already carried out extensive development programs and have assisted the associations with grazing management plans. FHA has loaned nearly \$10 million to associations to

purchase land capable of supporting 33,000 cattle annually during Montana's 6-month grazing season.

About \$750,000 is programed for stock-water developments, range seeding, cropland conversion, fencing, and related conservation developments. Half of the development costs are scheduled for cost-sharing under the Great Plains and Agriculture Conservation programs. Association members are buying the land and are including development and operation costs for around \$5 per animal-unit-month.

The additional summer grazing, coupled with winter feed bases on their home ranches, will enable the grazing association members to stay in business in the face of the ever-present cost-price squeeze. ♦

Private range and elk herd both gain in deal between ranchers and state

By Neal S. Bue and John Davis

District conservationist and range specialist, SCS, St. Anthony and Idaho Falls, Idaho

An exchange of grazing privileges and other cooperation between the Siddoway Sheep Company and the Idaho Fish and Game Commission helped halt range deterioration on the Siddoway ranch and doubled the safe size of an elk herd that wintered there.

Brothers Bill, Bud, and Denton Siddoway operate a 35,600-acre spread headquartered at St. Anthony, Idaho, where their grandfather, James Siddoway, homesteaded in the late 1880's. Bill is a national director of the National Wool Growers Association.

Range improvement

Cooperating with the Yellowstone Soil Conservation District, the Siddoway brothers in 1963 embarked on a program of range improvement including extensive control of big sagebrush and re-seeding of grass.

A special problem was a sizable elk herd that wintered on some of the Siddoways' best early-grazing land. The brothers worked out an agreement with the Idaho Fish and Game Commission under which the commission helps pay the cost of seeding some of the depleted range in exchange for the use of the wintering area by the elk herd. The commission also permits the Siddoways to use some of the state's game range while the seedings are becoming established.

At the beginning of the cooperative effort, about 500 head of elk was considered the practical size for the herd. With additional land and improved forage, the herd has increased to more than 1,000 head. Range deterioration has been greatly reduced or eliminated.

Initially, about 235 acres of former cropland was seeded to crested wheatgrass and Ladak al-

falfa. Encouraged by the success of this seeding, an additional 1,400 acres has been planted to various grasses, including intermediate wheatgrass, Whitmar wheatgrass, and Manchar brome grass. Sainfoin and hairy vetch have also been planted instead of the alfalfa.

"This agreement was one of the best things that ever happened to us," says Bill. "It not only gives the elk a good wintering area, but it gives us about 10 days earlier grazing in the spring, so we all gain."

Landholder-Sportsman

The Siddoways were recognized for their efforts by the Idaho Landholder-Sportsman Council in 1965 when they were awarded the "Landholder-Sportsman of the Year" plaque in recognition of "Outstanding leadership and promotion of improved landholder-sportsman relations."

The sheep operation is based on a breeding herd of approximately 6,000 ewes with necessary replacement yearling ewes and rams. The range resources are comprised of five separate units of deeded and leased land. In addition, the operators hold grazing rights on Fremont County Woodgrowers' land and permits on adjacent land administered by the Bureau of Land Management. They also have permits for six bands of ewes and lambs for summer grazing on the Targhee National Forest south of Yellowstone National Park.

The Siddoways' operation also includes a 320-acre irrigated farm used mainly for production of winter feed. Additional hay and other winter forage, as required, are purchased locally or from other available sources.

The Siddoways work out exchanges with other landowners for adjoining tracts in order to "block up" the operating units and effect better control of livestock and grazing use. ♦

The first cooperative grazing association in North Dakota is finding the cooperation of USDA agency programs an effective aid to the cooperation of members in the successful operation of its grazing land.

The Horse Creek Cooperative Grazing Association, a cooperator with the Bowman-Slope Soil Conservation District, was formed in 1967 by ranchers from western North Dakota and eastern Montana.

Members arranged to purchase most of a Slope County ranch along the Little Missouri badlands with a Farmers Home Administration loan. It was the first such association financed by the FHA in the state.

During the time that negotiations for financing and purchasing the land were underway, the owners-to-be worked out a conservation plan with the assistance of Soil Conservation Service and Forest Service technicians. A Great Plains Conservation Program contract was signed soon after the land purchase was completed.

Public and private

Included in the total acreage now managed according to that plan are 9,000 acres of National Grassland administered by the Forest Service and 1,600 acres of school land ad-

Agency, owner cooperation aids grazing association

By Robert W. Runner

Range conservationist, SCS, Bowman, N. Dak.

ministered by the North Dakota State Land Department.

Terms of the Great Plains contract provide for cost-sharing for grass seeding, pond construction, cross fencing, and well drilling on the private land. In addition, Forest Service provides cross-fencing and range reseeding on the National Grassland range. Several wells have been cost-shared by the ASCS Agricultural Conservation Program.

"We obtained this unit to provide additional summer grazing. We have to make the most efficient use of each acre if it's going to pay off," Association President F. E. Plummer said. "This means cross-fencing for more manageable pasture sizes, water development so we can use these pastures at any time during our grazing season, and other types in intensive management.

During their inspection tour in 1969 the group found that con-

siderable progress had been made. Approximately 1,100 acres of cropland had been seeded to native grass, 15 stock-water ponds built, and seven wells drilled. Three cross-fences with a total length of about 8 miles had been built.

"In pastures that are now fenced and watered, we distributed grazing fairly well, but in the largest pasture that is not yet cross-fenced, we grazed some areas a little too heavily," Plummer reported.

Utilization check

At the site of a utilization cage set up by the Forest Service during the 1968 growing season, members could compare plant growth inside the cage with that in the grazed area. The difference in height indicated that the degree of use had reached about 70 percent. Utilization checks in other pastures showed use of less than 50 percent.

"When we have completed another 8 to 10 miles of cross-fencing and established grass on all land formerly cropped, then we can follow our planned grazing system," Association Secretary Faye Beach said. "We think this will greatly reduce our grazing distribution problems. Everything we've done so far has brought us close to uniform use and management of the pastures." ♦



Association officers, 4-H members, and representatives of federal agencies compare the height of grass grown in the protection of a "utilization cage" (which has been removed from spot in right foreground) with that of the surrounding grazed pasture.

New York farmers discover winter income

By Donald J. White and Homer E. Stennett

Resource development specialist, Cooperative Extension Service, and project coordinator, SCS, Albany (formerly Ellicottville) and Little Valley, N. Y.

More than 100 rural families in the southwestern corner of New York have discovered "gold" in their surrounding hills by transforming idle farmland into a skier's winter wonderland.

Until recently, French Creek villagers in Chautauqua County had tough sledding when up to 240 inches of snow covered their highland dairy farms, burying most of their jobs until the spring thaw. By most standards, the area itself was economically depressed, so rather than remain many residents chose to commute over hazardous roads to distant factories.

Then, in 1963, Phil Gravink, a French Creek native who graduated from Cornell's College of Agriculture and returned home to farm, set out with four neighboring businessmen to develop a ski center that they called Peek'n Peak. As a farmer, Gravink had long been a cooperator with the Chautauqua County Soil and Water Conservation District. When he commenced the ski venture, SCS and the district directors took an active interest and recommended conservation measures that would protect the steep slopes. Not only did the vegetation halt erosion, but it also acted as insulation to keep a better snow base longer—122 days in 1967.

All of the money for development was raised locally—by 100 people who brought \$160,000 worth of stock and a bank that loaned an equal amount. As the ski center entered its 1969 season—its fifth year of operation—continued growth has brought their investment to \$700,000. New facilities include equipment that will lift 4,000 people an hour up the slopes.

Virtually all of the people needed to build and operate the development were hired locally, and demonstrated that their farming skills were well adapted to the new endeavor—clearing and seeding, constructing roads and buildings, operating equipment and materiel.

A typical example of locally produced talent being put to new use is Lester Marback, a part-time farmer and carpenter, who joined the ski center project in its infancy and remained to become a valuable member of the Peek'n Peak staff.

He and Superintendent George

Workmen at the Peek'n Peak Ski Center install T-bar ski-lifts that have altered the agricultural economy in southwestern New York.



Boozel and Business Manager Myrl Babcock are among the 130 people who keep the ski area operating. Altogether, there are 71 men and women on the operational and kitchen staff, 15 people in the ski shop concessions, 26 ski instructors, nine contractors who employ 18 people variously skilled as well-drillers, carpenters, electricians, and heavy equipment operators. Thirty-five are employed year-round.

Indirect benefits

French Creek residents are feeling other indirect benefits from the ski center. Young people, like Duane Gabriel, who recently completed his military service and returned to French Creek, are finding good employment opportunities at home without moving into the cities. A local lumber company is adding employees and lumber stock to meet the increased business from the ski area and secondary developments. They are also using more locally produced lumber—mostly hemlock—and thus increasing the work-force in woodlots and sawmills.

Western New York produces large amounts of maple sirup and other maple products, which skiers are now buying in larger quantities. Restaurants which formerly operated only in summers are now open all year. Old farmhouses are being reopened and refurnished to house

Phil Gravink, project designer and original sponsor, oversees expansion.



Concessions provide tasty food for visitors and new income for residents.



George Boozel, machinery repairman, maintains ski-lift equipment.

skiers, and summer cottages at neighboring Findley Lake are being winterized for all-year use.

Four motels, with 350 beds altogether, now enjoy capacity crowds throughout the winter, which formerly was their slow season. A trailer court has been expanded and a new campground has been established near the skiing area, while private buildings are buying attractive sites along the French Creek Valley.

Future plans?

Peek'n Peak's next planned development is the construction of vacation homes which will be built on the property under management supervision. Two chalets currently are

going up, with five others ordered. Again, experienced local craftsmen are handling the construction work. The lots for the chalets are part of a farm purchased for \$30 an acre and now being sold, after adding roads, water, and sewage systems, for \$6,000 an acre.

Developers expect that the current second home construction will add \$500,000 valuation to the town's tax rolls within a few years. In 1968, the company paid \$5,000 in taxes on land that paid \$250 in taxes 5 years earlier.

Phil Gravink, the operational manager of the ski center and director of the development project, is naturally pleased that the venture is paying off. Even more, he is pleased that the formerly depressed area around French Creek is making the most of its human and natural resources toward complete economic recovery.

People who come to ski, as well as local residents who host the visitors, are equally pleased to see the results of their efforts. ♦

Cowhands of the old West sang about "cool, clear water." It was the subject of dreams along many a dusty trail. And it was the cause of a few shootings.

Ranchers in Sioux and Dawes counties, in the extreme northwestern corner of Nebraska, have about quit singing about it except at barbecues, and there have been no shootings lately. But there is "cool, clear water" now. It comes down out of the sandy ridges and travels many miles across the plains in a plastic pipe. It wasn't always so convenient.

A way of life

People have been hauling water on wagons or trucks since the country was settled in the 1890's. At times it was the only item scarcer than money. For many, water hauling had become a way of life, just like making hay or branding calves.

Nearly a million acres of good grazing land in the two counties is not being properly used because of lack of water. Areas of Pierre, Chadron, and Niobrara shales won't yield enough water for wells, yet the grass is lush. Another 180,000 acres of Brule siltstone derivatives yield a questionable amount of water of equally questionable quality. But grazing is good here, too.

Supervisors of the Sugarloaf and Scotts Bluff soil and water conservation districts, which make up the area, had been talking about pipelines for about 5 years when they took a trip over into Colorado to look at some. They came back convinced they would work in Nebraska.

Jess Locker, Harrison, was a pioneer and a prime mover of Antelope Pipeline, Inc., the first organization of its type to be certified under Nebraska law. Fresh water has been flowing through the Antelope Line since January 1967.

Formerly, Locker was hauling 250 gallons of water a trip in a tank on his pickup, and sometimes he had to make two trips a day to Har-

A story of cool, clear water . . .

Plumbing on the plains

ison, 20 miles away. A tankful would serve the house for 12 days, if everyone was careful. Mrs. Locker kept her old-fashioned wringer-type washer because it used less water than a more modern one. They moved the cattle around in dry spells to make water hauling easier. Sometimes the water truck was busy all day.

A modernized household

Now the Lockers have a new automatic washer, a dishwasher, and five stock-watering tanks. The tanks are spotted over the ranch to serve the herds and distribute grazing to best advantage.

Antelope Pipeline is 22 miles long and serves eight ranchers. It cost about \$50,000 to get a main line in. Each rancher pays for his own feeder lines and tanks. The Agricultural Stabilization and Conservation Service cost-shared 60 percent of mainline costs, or about \$28,000. Users divided the rest of the cost among them. Jess Locker figures the line cost him about \$2,500, but it was well worth it.

Users own the line. Each pays a nominal monthly charge to take care of the cost of pumping plus a little backlog for any possible maintenance costs. About \$5 to \$8 is average.

Getting organized

The first line was so successful that local leaders could see right away they were going to have to get organized if they met the demand. Supervisors of the two soil conservation districts contacted each rancher and got signed petitions for water in order to have demands in writing. The Extension agents sent questionnaires to the entire rural population to determine who had water and who needed it. The two

ASCS committees asked for, and got, approval to extend cost-sharing to other pipelines. The Great Plains Conservation Program also cost-shares pipeline construction for participants who contract to install a complete conservation plan for their land.

And other pipelines have gone in. To date there are 245 miles of them

An old army wagon originally used to haul water to Ft. Robinson saw later service on a ranch. Below, Jess Locker has "retired" his water tank now that he is on a pipeline.





A contractor opens a 5-foot-deep trench across the plains and lays a 2-inch plastic pipe to bring water to members of Antelope Ditch, Inc. Cattle then gather around the watering tanks at the end of the line.

in the ground in the two counties. Surveys have been made for another 400 miles.

The Soil Conservation Service surveys and designs the lines and supervises the installation. ASCS committees and conservation district supervisors steer the forming of corporations. The rural electric cooperative puts in the first half mile of powerline free, then does the rest of the job at \$1,800 per mile.

Each rancher gets 20 gallons a day per animal unit, plus 500 gallons a day for household use. Most of them had plumbing in the homes, once supplied by cistern or tanks, so the new water flows right in. Under the terms of the incorporation, livestock and household are the two legal uses for the water.

Until the advent of plastic pipe, these lines wouldn't work. The high salt content of the soil quickly destroyed any metal pipe buried in it.

The 160-pound test line is buried 5 feet deep to get below the freeze problem. Joints are glued. Long lines begin with a 3-inch size, step down to two, and lead off into 1-inch feeders. Contractor Ed Ehrhart, who has laid most of them, guarantees materials and workmanship for 20 years.

Wells up in the sandy ridges are of 8-inch bores. They go 50 to 250 feet deep, depending on the depth required to get 25 to 40 gallons a minute per well.

Water is the key to grazing management, which in turn is the key to range conservation. Water where it is needed keeps cattle moving about over the range, using the grass uniformly. Water at the right places let the rancher divide his range with fences so he can defer grazing where needed to let grasses recover.

One of the stories going the rounds of the Panhandle is of the rancher who subscribed to the pipeline and had plenty of fresh water in the house. But one day when he came in from work he went straight to the kitchen and emptied his canteen back into the pail. Old habits are hard to break. ♦

Meetings...

Grazing fees, taxes concern wool growers

The National Wool Growers Association will hold its annual convention in Denver, Colo., on January 21-24. The association is concerned with decreasing sheep numbers, imports, diseases, taxes, and public land grazing fees. Many of the wool growers are conservation district cooperators, and many also use public land for grazing. Their conservation programs often involve joint planning with the land-administering agencies.

Information fair to feature cooperatives' meeting

An information fair will display prize winning cooperative magazines, newspapers, newsletters, and other information materials at the 41st annual meeting of the National Council of Farmer Cooperatives January 13-14 in Hollywood, Fla. Among the topics to be featured in the discussions are "Alliances for Action," "Impact of Tax Law Changes on Co-op Growth," and "An All-Systems Approach to Cooperative Growth."

Cattlemen to discuss land recreation problems

The annual meeting of the American National Cattlemen's Association will take place in Washington, D.C., on January 25-28, with the Virginia and Maryland Cattlemen's Associations as hosts. Grazing fees on public lands, taxes, livestock marketing, landowner-recreationist problems, and other conservation issues are subjects for discussion.

Dates and places

January 13-14, 1970, National Council of Farmer Cooperatives, Hollywood Beach, Fla.

14-17, Garden Seed Conference, New Orleans, La.

21-24, National Wool Growers Association, Denver, Colo.

24-28, American National Cattlemen's Association, Washington, D. C.

26-30, American Society of Civil Engineers Water Resources Conference, Memphis, Tenn.

February

1-3, Sprinkler Irrigation Association, Denver, Colo.

1-5, National Association of Soil and Water Conservation Districts, San Francisco, Calif.

9-12, American Society of Range Management, Denver, Colo.

14-18, American Association of School Administrators, Atlantic City, N. J.

24-26, Land Improvement Contractors of America, Las Vegas, Nev.

25-28, American Camping Association, St. Louis, Mo. ♦

Roadside hay strips for pheasant nesting cover

A hayfield 68 miles long and only a few yards wide has been seeded in Ford County Soil and Water Conservation District, Ill., as part of an experiment in providing spring nesting places for pheasants.

The wildlife habitat planting project is being conducted by the Illinois Department of Conservation. It was initiated in response to concern about the effects of fall plowing and decreasing hay production on the pheasant population of east central Illinois. Field studies show that from 60 to 70 percent of the pheasant hatch comes from hayfields.

Someone with the Illinois Natural History Survey suggested that publicly owned roadside ditches be put into hay. As a result, roadbanks in a 16 square-mile area were seeded to an alfalfa-brome mixture.

Sixty-five farmers have agreed not to mow until August 1 each year. They will also exercise care when using herbicides along fence-rows or field ends.

The Natural History Survey will make comparative population counts. Similar roadside plantings have yielded up to three nests per acre in the past.

Funds for the project will be drawn from hunting license fees and a tax on hunter's ammunition.—**STANLEY LANTZ**, farm editor, "Bloomington Pantagraph," Bloomington, Ill.

A better environment for all people

Summary of activities of the Soil Conservation Service for fiscal year 1969

As we move into the seventies, an intensified drive for quality joins the concern for quantity in resource conservation and environmental management.

- Quality in the natural resource base to meet any foreseeable use or production needs.
- Quality in the environment for the use and enjoyment of all people.
- Quality in the living standard of rural families based on improved income.
- Quality in rural communities to provide attractive, convenient, and rewarding places to live and work.

Program activities are designed to complement and supplement each other in a total commitment to building harmony into the dynamic ecological system that is man's environment.

In the final year of the sixties, the Soil Conservation Service devoted an increasing share of available technical assistance to community resource development, erosion and sedimentation control, and other measures to bring about a cleaner, healthier, and more attractive environment for all people.

While continuing to give service to individual land owners and users at about the same level as previously, SCS in fiscal year 1969 greatly increased its assistance to local units of government and community organizations.

Local authorities increasingly looked to local conservation districts and the Soil Conservation Service to provide basic data on land and water resources for use in making decisions about land use and management at community, area, and regional levels.

In hundreds of communities, large and small, the Soil Conservation Service contributed substantially in dealing with agriculture-related pollutants of soil, water, and air and improving the esthetic aspects of land treatment and management.

Community service

In response to requests from planning officials and community

leaders, SCS provided 51,301 planning and onsite technical services to 18,191 governmental units or planning organizations during the year.

During 1969 SCS provided 4,187 resource inventories and evaluations to planning commissions or other agencies of local, state, or federal government. Such information included special soil survey reports and interpretations, water inventories, watershed data, conservation needs inventories, and information on conservation practices needed or applied.

Results of the information and counsel showed up in 568 communitywide, county, or regional resource plans, adopted by governing bodies, that included land use determinations made with SCS assistance.

In addition, 320 land use regulations, land-treatment control requirements, zoning ordinances, sanitary codes, building codes or standards, and the like, based on technical assistance or information provided by SCS, were issued or enacted by government bodies for public benefit.

SCS made field investigations and provided soil and water data and interpretations for site selection for 1,567 public facilities, such as schools, hospitals, sanitary landfills,

recreation areas, and sewer and water facilities.

Conservation districts

At the end of fiscal year 1969, 99 percent of the Nation's farms and ranches and 97 percent of private agricultural land were included in 3,017 conservation districts in the 50 states, Puerto Rico, and the Virgin Islands. All these districts are being assisted by SCS. They contain an approximate total area of more than 1.8 billion acres.

Seventeen new soil and water conservation districts were organized in fiscal year 1969. Consolidation of existing districts resulted in a net increase of five districts.

Assistance to individuals

At the same time, SCS conservationists and specialists performed 3¼ million technical services for about 1¼ million individual land owners and users in planning or implementing conservation measures, mainly through soil and water conservation districts.

SCS helped district cooperators prepare 80,829 new conservation plans and revise 37,960 existing plans in fiscal 1969. About 38 percent of the total operating units in the Nation, or about 1.7 million of them, have conservation plans covering 565.8 million acres. More than 701,000 cooperators established one or more needed conservation practices on their land as a result of SCS technical assistance. This added approximately 47 million acres to the land recorded as being adequately treated for its conservation needs. At the end of the year, 515 million acres or about 28 percent of the land in conservation districts was adequately treated.

Small farmers and minorities

The Soil Conservation Service continued assistance to small farmers (those usually grossing \$10,000 or less annually) and rural residents living on small nonfarm tracts. Assistance to Negro and other minority groups in fiscal 1969

was consistent with the ratio of minority cooperators to white cooperators.

Group enterprises

Groups of land users solving conservation problems by developing group conservation and construction plans with SCS technical assistance rose 20 percent to 4,735, compared to 3,901 in 1968. More than 11,000 land users controlling almost 4 million acres were included in group conservation enterprises.

RC&D projects

Significant economic progress is being made in terms of employment and additional gross income being generated in 44 operational resource conservation and development project areas.

Measures completed at the end of fiscal year 1969 had provided more than 16,000 man-years of employment during installation and promised a like amount of continuing employment expected to result in \$165 million in increased income annually.

SCS provided technical assistance, loans, and other financial help during the year for more than 5,000 measures with tangible community benefits. Other Federal departments, state agencies, and local groups rendered assistance in supporting and furthering project objectives.

SCS also provided assistance to local sponsors developing plans of action for seven other projects. Altogether, SCS worked with 51 RC&D projects totaling 173.5 million acres during the year. Another 51 applications, covering 159.1 million acres, were on hand at year's end awaiting authorization for planning assistance.

Great Plains Program

The Great Plains Program continues to apply, through long-term contractual arrangements, needed conservation treatment on entire farm and ranch units in 424 designated counties of the Great Plains region.

Priority is given where cropland unsuited for sustained cultivation is still being used for that purpose. Nearly 2 million acres of such cropland has been converted to grass since the program began. Roughly 21 percent of all the cropland in Great Plains Conservation Program contracts is planned for conversion.

In fiscal 1969, 3,484 farmers and ranchers placed 5.8 million acres under Great Plains Program contracts. Well over 34,000 farmers and ranchers now either have completed or have underway contracts for conservation treatment of more than 62 million acres.

A recent study of more than 4,000 contracts revealed that about 93 percent of them were maintaining sound conservation programs, or had made further improvements after contract expiration. Change of ownership accounted for most of the inadequate maintenance that existed.

Wind-erosion damage in the plains in the winter and spring of 1969 was the lowest recorded in 35 years of reports maintained by the Great Plains Agricultural Council and the Soil Conservation Service. A total of 995,150 acres was damaged in the 1969 "blow season," a decrease of more than 15 percent from the year before. In the drought years of the 1950's the acreage damaged by wind in a single season reached as high as 15.8 million acres. The decline is attributed in part to the increased use of soil and water conservation practices by Great Plains landowners.

Watershed projects

Watershed protection and flood prevention projects not only protect and develop the water and related land resources in upstream watersheds, but they also significantly enhance the economic development of surrounding areas.

More than half of the operating watershed projects is located in areas where low income prevails. By the end of fiscal 1969, construction and industrial expansion generated

by small watershed projects had created an estimated 50,700 jobs and added about \$152 million to payrolls of previously unemployed or underemployed people.

Since the beginning of the program in 1954, watershed projects have prevented an estimated \$142 million in property damages. Severe erosion has been curbed on 1.4 million acres and 11.5 million tons of sediment has been held out of streams and off bottom lands.

Estimates from each of the 50 states showed flood and sediment damages prevented during fiscal year 1969 by structural measures installed in the 50 pilot watersheds and 686 Public Law 566 projects totaled almost \$40 million.

New reservoirs have provided municipal and industrial water supply for 260,000 people in 45 rural communities.

Planned recreation development for more than 250 reservoirs in 40 states will eventually support 12.5 million visitor-days of use annually. Last year, more than 12,000 acres of land and water habitat for wildlife was improved by reforestation and other conservation practices.

During the fiscal year federal assistance was furnished to sponsors of 732 approved projects. Initial agreements for construction were signed in 54 projects located in 33 states, bringing the total to 686 projects that have entered the construction stage. Sponsors of 33 projects completed the installation of all measures in 1969. A total of 238 projects have now been completed.

Local sponsors submitted 129 new applications for assistance under Public Law 566 during fiscal year 1969. Planning assistance was authorized for 100 projects, leaving a backlog of 1,284 unserved applications at the end of the year.

A total of 103 projects were approved for operations. Another 32 plans were awaiting approval by Congressional committees at the year's end.

The multiple-purpose concept is strongly reflected in projects

planned during fiscal year 1969. Of the 103 plans approved for operations, 66 or 64 percent included more than one purpose.

Pilot studies on the collection and automatic storage and retrieval of watershed data moved ahead in 1969. To date programs have been written and data assembled on magnetic tape identifying and describing all projects in operation through fiscal year 1968, plus some 600 individual reservoir-type structures.

River basin surveys

During fiscal year 1969, the Department carried on investigations in 59 river basins. Twenty-four of these are comprehensive interagency studies being coordinated by the Water Resources Council established under the Water Resources Planning Act of 1965, Public Law 80. Most of the other studies are carried on in cooperation with state water-resource agencies that require information on the agricultural, rural, and upstream watershed aspects of water and related land-resource development. Among the studies completed is the Water Resources Survey for the Appalachian Region.

The Soil Conservation Service has leadership for the Department's participation in these studies.

Soil surveys

The National Cooperative Soil Survey continues to provide maps and interpretations of soil information useful not only to farmers and ranchers but also to planners and builders in urbanizing areas and users of nonagricultural land.

Modern soil surveys suitable for operational planning now cover about one-third of the land needing them in the United States, including Puerto Rico and the Virgin Islands. About a third of these are published for general use in critically important areas. In fiscal year 1969, 43 survey areas, covering about 19 million acres, were published and 42 others, for more than 22 million acres, were sent forward for printing.

Detailed soil mapping was completed on 45.0 million acres and reconnaissance mapping on 3.8 million acres. In addition, special mapping for conservation planning was done on 7.8 million acres in areas where detailed surveys are not available.

The demand for general, or small-scale, soil maps also continues to grow. Such maps and their interpretations guide the more general and regional planning for large areas and counties. In many states such maps are prepared from existing data, including the reinterpretation of older published soil surveys that do not meet the full needs for operational planning. Several states have such maps for nearly all counties.

Urban planners and developers, engineering companies, and others increasingly use soil surveys in planning construction to take into account soils having severe limitations for houses, roads, and the like.

A start has been made on a new soil map of the United States at the scale of 1:1,000,000 which will be especially useful for planners concerned with multicounty and regional land use and resource problems. At this scale 13 large sheets will be required for the 48 contiguous states. Work is well along on the two easternmost sheets. Each map sheet will be accompanied by a comprehensive table setting forth important interpretations for all map units.

A new small-scale (1:7,500,000) map of the United States was printed by the U.S. Geological Survey as part of *The National Atlas*. It shows the distribution of soil orders, suborders, and great soil groups according to the new system of soil classification.

A soil map showing distribution of major kinds of soil in the world was drafted for publication at a scale of about 1:50,000,000.

The classification of soil series of the United States was nearly completed in a form that permits future handling by automatic data proc-

Summary of Progress, Fiscal Year 1969

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	Cumulative to June 30, 1969	Progress items	Total reportable progress	Cumulative to June 30, 1969
Conservation plans and related services			Cropland before GP		
District cooperatorsNo.	98,087	2,193,102	contractacres	909,320	9,597,694
“ “acres	37,081,508	749,414,343	Planned cropland conversionsacres	156,752	1,974,011
Cooperators canceledNo.	65,534	—	Servicing other USDA programs		
“ “acres	21,052,816	—	Referrals serviced:		
Recipients of technical assistanceNo.	1,180,703	—	ACP—F. Y. 1969No.	284,205	—
Technical servicesNo.	3,207,094	—	“ —P. Y. 1968No.	—	299,251
Recipients applying practicesNo.	701,623	—	Cropland Adjustment ProgramNo.	77	—
Special mapping for planning and CNIacres	7,798,216	233,737,484	Cropland Conversion ProgramNo.	17	—
Conservation plans preparedNo.	80,829	1,721,228	Appalachian ProgramNo.	1,338	—
“ “ “ “acres	30,278,516	565,882,414	Conservation plans approvedNo.	2,732	—
Conservation plans canceledNo.	50,070	—	Soil surveys		
“ “ “ “acres	15,920,198	—	Detailed soil surveysacres	45,071,452	751,590,364
Conservation plans revisedNo.	37,960	—	Reconnaissanceacres	3,768,750	24,754,559
“ “ “ “acres	23,069,039	—	(Total surveys)acres	(48,840,202)	(776,344,923)
Inventories and evaluations preparedNo.	17,072	—	Soil conservation surveysacres	—	28,120,548
Federal lands in coordinated conservation plansNo.	143	740	Soil conservation surveys canceled or convertedacres	1,097,999	—
“ “ “ “acres	1,775,165	9,359,981	Snow surveys and water-supply forecasting		
State and county CNI reportsNo.	34	—	Snow course measurementsNo.	6,294	—
Resource planning and implementation			Aerial snow marker readingsNo.	1,003	—
Services on resource plansNo.	51,301	—	Mountain precipitation gage readingsNo.	1,726	—
Units of government assistedNo.	18,191	—	Soil moisture station readingsNo.	1,557	—
Resource plans preparedNo.	568	—	River stations for which numerical forecasts issuedNo.	459	—
Inventories and evaluations for resource plansNo.	4,187	—	Numerical forecasts issuedNo.	1,972	—
Land use regulations establishedNo.	320	—	Recreation developments		
Site selection for public facilityNo.	1,567	—	Land owners and operators who have:		
Operating units			Established their first commercial recreation enterpriseNo.	1,642	49,139
Total operating unitsNo.	8,330	4,553,987	Expanded or added to commercial recreation enterprisesNo.	764	—
“ “ “ “acres	1,916,202	1,380,323,981	Changed to recreation enterprises as their primary source of incomeNo.	240	8,743
Miscellaneous land usersNo.	171,204	3,004,794	“ “ “ “acres	142,437	1,741,563
Resource planning unitsNo.	25,002	73,477	Private noncommercial recreation facilities established or expandedNo.	26,218	454,019
Group conservation plans and services			Public recreation facilities, established or expandedNo.	544	27,861
Group conservation plansNo.	1,265	6,215	Watershed and RC&D Project measures		
“ “ “ “acres	2,195,052	9,196,229	Floodwater structure sites investigatedNo.	367	—
Group investigationsNo.	4,136	49,747	Channel sites investigatedmiles	425	—
“ “ “ “acres	4,376,897	41,534,757	Flood structures surveyedNo.	475	—
Group construction plansNo.	3,470	47,049	Channels surveyedmiles	644	—
“ “ “ “acres	1,625,773	28,162,046	Floodwater structures designedNo.	406	—
Groups assistedNo.	11,085	—	Channels designedmiles	595	—
Services to groupsNo.	74,221	—	Services on land rightsNo.	23,291	—
Groups applying practicesNo.	2,829	—	Floodwater structures under constructionNo.	944	—
Great Plains Conservation Program			Channels under constructionmiles	1,073	—
GP applications receivedNo.	3,879	40,004			
“ “ “ “acres	7,374,796	75,940,028			
GP contracts signedNo.	3,484	34,662			
“ “ “ “acres	5,817,564	62,240,420			
GP contracts terminated:					
By mutual consentNo.	150	956			
“ “ “ “acres	123,663	1,400,075			
For causeNo.	95	766			
“ “ “ “acres	54,679	643,966			
By expirationNo.	2,950	14,015			
“ “ “ “acres	4,841,422	22,383,209			
(Total terminations)No.	(3,195)	(15,737)			
“ “ “ “acres	(5,019,764)	(24,427,250)			

Summary of Progress, Fiscal Year 1969—Continued

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Conservation practices established	Total reportable progress	On the land June 30, 1969	Conservation practices established	Total reportable progress	On the land June 30, 1969
Beddingacres	25,468	585,718	Proper grazing useacres	72,157,778	227,831,966
Brush controlacres	4,332,867	41,279,696	Pumping plant for water controlNo.	1,941	54,207
Irrigation canal or lateral ..miles	225	43,479	Grazing land mechanical treatmentacres	75,052	2,068,247
Chiseling and subsoiling ...acres	761,503	5,707,656	Range seedingacres	485,780	13,344,072
Clearing and snaggingmiles	451	4,677	Irrigation pit or regulating reservoirNo.	1,517	45,211
Conservation cropping systemacres	24,332,136	182,174,183	Range rotation—deferred grazingacres	3,782,600	16,239,616
Contour farmingacres	3,837,962	45,654,610	Access roadmiles	1,174	9,507
Controlled burningacres	368,114	4,160,231	Recreation area stabilizationacres	2,094	88,245
Critical area plantingacres	123,740	6,094,954	Recreation area improvementacres	42,404	486,472
Crop residue management ..acres	22,441,188	149,859,727	Recreation land grading and shapingacres	12,125	176,956
Dam, diversionNo.	514	23,400	Recreation trail and walkwaymiles	387	4,777
Dam, multiple-purposeNo.	305	5,282	Spring developmentNo.	4,734	112,368
“ “ “ “ .acre-feet	65,357	4,445,021	Stock trailmiles	169	3,605
Debris basinNo.	1,393	81,128	Streambank protectionmiles	464	6,839
Deferred grazingacres	14,253,655	58,982,366	Stream channel improvementmiles	1,016	14,431
Dike and leveemiles	300	10,180	Stream channel stabilizationmiles	9	625
Irrigation ditch and canal liningmiles	1,414	25,722	Stripcroppingacres	616,980	20,044,130
Diversionmiles	2,370	96,719	Structure for water controlNo.	89,696	2,067,395
PondNo.	46,487	1,700,353	Drainage field ditchmiles	5,389	164,264
Farmstead and feedlot windbreakacres	43,058	593,206	Terrace, basinmiles	71	2,709
Field border plantingmiles	1,343	44,017	Terrace, gradientmiles	11,184	763,933
Irrigation field ditchmiles	2,047	124,368	Terrace, levelmiles	9,515	383,070
Field windbreakmiles	3,950	90,303	Terrace, parallelmiles	7,551	63,064
Fish stream improvement ..miles	13	62	(Total terraces)miles	(28,321)	(1,212,776)
Fishpond managementNo.	57,435	483,383	Tile drainmiles	23,408	745,081
Floodwater diversionfeet	38,577	1,208,621	Toxic salt reductionacres	73,124	1,288,359
Floodwater retarding structureNo.	420	9,751	Tree plantingacres	321,636	17,676,752
“ “ “ “ .acre-feet	245,005	4,590,046	Trough or tankNo.	12,572	398,707
Floodwaymiles	54	651	Waterspreadingacres	20,528	1,037,253
Grade stabilization structureNo.	10,483	194,752	WellNo.	7,966	447,778
Grassed waterway or outlet .acres	123,331	1,695,110	Wildlife wetland managementacres	298,696	3,178,880
Hedgerow plantingmiles	293	25,506	Wildlife habitat managementacres	4,069,626	16,350,125
Hillside ditchmiles	190	5,079	Wildlife watering facility ...No.	1,354	12,449
Irrigation pipelinemiles	3,684	64,785	Woodland direct seeding ...acres	15,487	571,179
Irrigation storage reservoirNo.	507	39,625	Woodland improved harvestingacres	1,430,277	25,903,069
“ “ “ “ .acre-feet	29,631	8,313,378	Woodland improvement ...acres	553,659	13,168,605
Irrigation system, sprinklerNo.	3,999	113,445	Land treated		
Irrigation system, surface and subsurfaceNo.	5,327	131,836	Land adequately treated ..acres	47,030,354	515,763,985
Irrigation system, tailwater recoveryNo.	807	10,308	Land use conversions¹		
Irrigation water managementacres	3,799,585	17,075,151	Cropland to grasslandacres	1,078,838	20,317,358
Drainage land grading ...acres	36,343	397,854	Cropland to woodlandacres	59,700	2,298,122
Irrigation land leveling ...acres	379,133	10,430,005	Cropland to wildlife—recreationacres	41,651	1,105,595
Land smoothingacres	279,522	5,961,345	Cropland to “other”acres	64,730	4,067,632
Minimum tillageacres	1,788,742	15,808,044	All other uses to cropland ..acres	199,406	6,129,369
Drainage main or lateral ..miles	6,414	326,354	All other uses (except cropland) to wildlife—recreationacres	402,342	5,766,093
Mulchingacres	73,961	583,783			
Woodland site preparation ..acres	115,492	3,247,336			
Pasture and hayland managementacres	10,886,031	48,799,623			
Pasture and hayland plantingacres	3,112,253	62,531,867			
Pipelinemiles	2,322	23,840			

¹ Conversions on the land June 30, 1969, are estimates of conversion since July 1, 1962.

essing methods. A concept of a soil data system for the National Cooperative Soil Survey has been developed.

Snow surveys

As an aid to water users in the west, snow survey and water supply forecasting activity increased in 1969. SCS issued 459 river stage forecasts, about 10 percent more than in 1968. The number of snow-course measurements and snow marker, rain gage, and soil moisture readings that are the basis of the water forecasts increased similarly. The information is useful not only to individual farm irrigators but to people responsible for planning and operation of water storage and river flow control facilities.

Conservation Needs Inventory

Updating the National Inventory of Soil and Water Conservation Needs was virtually completed in 1969. One state report was published, and all are expected to be available in calendar year 1970. A national statistical report is also being prepared.

Land treatment

The establishment of conservation practices by land owners and users continued at about the same level as in the year before, with technical assistance being provided by SCS personnel assigned to local conservation districts.

Cropland

In the conservation treatment of croplands, farmers made notable progress in the improved management of crop residues, especially through minimum tillage practices. Conservation crop-residue management was reported on 22.4 million acres, an increase of 23 percent over the previous year. Minimum tillage was used on 1,788,742 acres of row crops, an increase of 15 percent. It is estimated that another 17 million acres of small grains were planted on land protected with stubble-mulch tillage. These practices do much to reduce runoff and

erosion, thereby diminishing the amount of sediment in streams and dust in the air. At the same time, they reduce the labor and machinery costs of crop production.

Continued emphasis was placed on modern conservation systems to keep pace with new developments in farm equipment, materials, and methods. Use of parallel terraces, which are better adapted to the larger, faster, and more powerful farm equipment, continued to increase. Of the total terraces constructed, 27 percent were parallel this year compared to 23 percent last year.

The trend toward mechanization and automation of irrigation systems offers a means of further improvement in the effectiveness and efficiency of irrigation water management. Cooperating farmers increased the installation of surface and subsurface irrigation systems by 17 percent last year and installed a total of 10,133 irrigation systems of all types. SCS assisted cooperators in the application of irrigation water management according to conservation standards on 3.8 million acres.

On cropland requiring removal of excess water, landforming practices to prevent ponding and permit more timely farming operations continue to be one of the major improvements. Such land grading was completed on 36,343 acres in 1969, an increase of 4 percent. Most of the drainage improvements now being made are for upgrading existing systems on land previously drained. Additional benefits from reduction in mosquitoes result in improving living environment and diminishing the hazards of malaria and encephalitis.

Grazing land

On grazing land, proper grazing use, planned grazing systems, and fertilization were applied at an accelerated rate by cooperators in conservation districts. Proper grazing use was practiced on 72.1 million acres in 1969, and rotation deferred grazing was increased by

17 percent over the previous year to benefit 3.8 million acres. A total of 3.1 million acres of pasture and hayland seeding and 485,780 acres of rangeland seeding were established during the year.

Woodland

Woodland improvement in conservation districts made significant gains. Cooperators planted trees according to conservation plans on 321,636 acres and made direct woodland seedings on 15,487 acres. They planted 43,058 acres of farmstead and feedlot windbreaks and 3,950 miles of field windbreaks.

Today, more than ever before, woodlands are owned by people more interested in a place in the country for recreation, beauty, or just solitude than for the production and sale of wood crops. Within this setting, the Soil Conservation Service has adopted the concept that "Trees are for People," and is gearing an approach to include this type of owner.

Developing information about the adaptations of different kinds of soil to woodland use is a continuing effort of the Soil Conservation Service. During the fiscal year 1969, all available data were assembled, reviewed, coordinated, and recorded in a progress report by major land-resource areas. An automatic data processing system is being developed for the storage and retrieval of all soil-site information.

Wildlife land

Wildlife habitat management was instituted on more than 4 million acres, an increase of 27 percent over the previous year. In addition, wildlife wetland management was established on 298,696 acres.

Conservation plant materials

Eight new and improved conservation plants resulting from SCS plant materials work were cooperatively named and released in fiscal year 1969. They are: "Catalite" Boer lovegrass, "Lodorm" green needlegrass, "Tegmar" dwarf intermediate wheatgrass, "Pomar"

dwarf orchardgrass, "Barton" western wheatgrass, "Arnot" bristly locust, "Winnar" birdsfoot trefoil, and "Sonora" black grama.

The Soil Conservation Service over a several-year period has given plant materials assistance to the Department of Defense in an effort to stabilize blowing sand at Cam Ranh Bay base in Vietnam. SCS provided plant materials for test and, on the basis of successful trials, assisted the Department of Defense in locating commercial supplies of suitable seeds. More than 80 percent of the base is now stabilized.

Outdoor recreation

Private land owners and operators, private and quasi-public clubs, groups, and organizations, and county and municipal governments established or expanded approximately 30,000 recreation developments during fiscal year 1969 with assistance by SCS.

More than 443,000 acres of land was converted to wildlife and recreation use in fiscal year 1969, an increase of about 29 percent over the preceding year. Recreation area improvement was accomplished on 42,404 acres compared to about 27,000 acres in 1968, an increase of more than 57 percent.

Appraisals of potentials for recreation development have been completed in 1,479 counties with 810 additional counties scheduled for completion by June 30, 1971.

International activities

During 1969 the Soil Conservation Service continued its cooperative program of assistance to developing countries in their efforts to make their lands more productive and alleviate hunger and poverty.

Technical aid was provided through a formal agreement between the U.S. Department of Agriculture and the Agency for International Development (AID). SCS provides assistance in three ways: (1) training foreign nationals in this country; (2) special projects in the developing countries under partici-

pating agency service agreements (PASA); and (3) technical consultation and support for AID personnel serving overseas.

At the end of the fiscal year, SCS was providing technical assistance in seven countries under PASA arrangements: India, Nigeria, Senegal, Thailand, Tunisia, Turkey, and Zambia. A total of 39 SCS employees were working in these countries on long-term assignments (2 years). During the year SCS also provided 11 people for short-term details (2-6 months) to six countries.

The SCS also provided training in this country for 424 visiting technicians and administrators from 49 countries. Of these 337 were sponsored by AID, 38 were sponsored by Food and Agriculture Organization of the United Nations, 39 were sponsored by miscellaneous foundations and organizations, and 10 traveled at their own expense. These people spent a total of 5,390 man-days in office and field with Soil Conservation Service personnel studying technical, managerial, and administrative aspects of conservation work. ♦

Teacher uses conservation films

A high school social science teacher who attended a conservation workshop at Grambling College in Louisiana in 1962 has since shown 365 conservation films to more than 2,100 students.

The workshop convinced her that conservation has a place in the high school curriculum. She returned for a repeat of the workshop in 1963 and 1964.

The teacher is Miss Ollie Cornist of Esther Toombs High School in Delhi, La.

The films on soil and water conservation, forestry, and wildlife con-

servation are supplied by the Soil Conservation Service, Louisiana Forestry Commission, and the Louisiana Wild Life and Fisheries Commission. In addition to films she uses slide talks, filmstrips, and other visuals supplied by SCS Area Conservationist D. L. Richardson in Tallulah.

When films are shown she follows them with a question and answer period. In some cases quizzes are given to determine what the students learned. She also takes students on field tours to supplement films and other classroom studies. ♦



Review



Sagebrush hill becomes a protected homesite

A sagebrush hill has been turned into 5 acres of beauty on the Paul Martin farmstead near Dove Creek, Colo.

Martin selected a homesite along Colorado State Highway 141 to take advantage of the beautiful sunsets and panoramic view of the Abajo (Blue) Mountains in Utah. He contacted the Dove Creek Soil Conservation District for assistance in planning a farmstead windbreak before constructing the farmhouse.

The SCS conservationist suggested a horseshoe type of planting to meet the needs of the Martin family. The farmhouse and other buildings would receive protection, and the Martins would have a panoramic view from their living room window.

The five-row windbreak consisted of caragana, Chinese elm, Rocky Mountain juniper, and ponderosa pine. In the opening of the horseshoe, Martin planted fruit trees. These add beauty to the farmstead as well as produce fruit.

Now that the trees are well established, Martin says he has often stepped out of the house and didn't know the wind was blowing until he got away from the protection of the windbreak—F. DALE HAMMER, district conservationist, SCS, Dove Creek, Colo. ♦

Part of Martin's windbreak.



Can Primitive Farming Be Modernised. BY F. JURION AND J. HENRY. 1969. *Institut National pour l'Etude Agronomique In Congo*. Brussels, Belgium. 457 pp., illus.

This is a translation from the French of a book summarizing the vast agricultural research program in the Congo (Kinshasa) over the past many years as applied directly to the improvement of farming. It gives information on the kinds of tropical soils, original vegetation, climate, crops, practices, and yields together with the effects of the systems on future productivity.

The examples include farming under different conditions ranging from areas of humid tropical rain forest with few rainless days to woodland and savannah with dry seasons up to 6 months.

This book is a must for those responsible for agricultural development on tropical soils used by people having little experience with science and modern technology.—CHARLES E. KELLOGG, deputy administrator for Soil Survey, SCS.

Food For Us All. The Yearbook of Agriculture 1969. USDA. 360 pp., illus.; plus color plates. \$3.50.

The national food story in its many aspects is the subject of another in the series of consumer-oriented Yearbooks of Agriculture.

Editor Jack Hayes in his preface describes the book as "a popular encyclopedia of food for the consumer in country or city."

"'Food From Farm to You,' the first section of the Yearbook, describes the economics of food, from the farmer's field to the supermarket.

"The second section, 'Buying and Cooking Food,' is divided into the major food classes, from meat and poultry on to dairy products, fruits, vegetables, and—ultimately—pickles, spices, and herbs. House-

wives may find the tips on buying and the recipes especially helpful.

"Nutrition and planning meals are major components of the third section of the Yearbook, 'Food and Your Life.' Some of the chapter subjects emphasize basic food needs, creating good food habits, and money-stretching ideas to make your food dollar go further."

As usual, the book is written by a wide variety of authors, mainly from the Department of Agriculture, other federal agencies, and state land-grant colleges.

New publications

Soil Conservation Service. Rev. 1969. *USDA PA 818*. (8pp.) illus.; pocket size. Briefly describes the work of the Soil Conservation Service.

Natural Resources of Oklahoma. 1969. U. S. Dept. Int. 54 pp., illus. \$0.75. The latest booklet in the Department of the Interior's series describing each of the states lays special stress on Oklahoma's unique Indian heritage. The capsule history of the settlement of Indian and Oklahoma Territories and the turbulent relations of white men and red in the emerging state is an effective introduction to the discussion of land and water resources today.

Booklets of this series present increasingly well-balanced treatments of the various resources and of the federal, state, and local programs for their management and conservation. In this one, the several agencies are named and described in alphabetical order without respect to their departmental affiliations.

Soil surveys

Schoharie County, New York. BY DONALD F. FLORA, J. A. FERWERDA, K. T. ACKERSON, J. B. BARTLETT, E. CROCKER, F. R. TROEH, J. C. DIJKERMAN, A. R. SOUTHARD, AND C. F. CASADY. 1969. 53 pp., illus.; maps 4 inches to the mile (1:15,800).

Gallatin County, Illinois. BY DONALD L. WALLACE AND J. B. FEHRENBACHER. 1969. 136 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by Donald L. Wallace, F. L. Awalt, R. E. Bourland, F. N. Carroll, and L. M. Reinebach.

Perry County, Indiana. BY JOHN M. ROBBINS. 1969. 70 pp., illus.; maps 4 inches to the mile (1:15,800). Fieldwork by Robert E. Modesitt, William J. Moriarity, Donald A. Cranor, William E. Couch, and John M. Robbins, Jr.

Vernon County, Wisconsin. BY ROBERT W. SLOTA. 1969. 82 pp., illus.; maps 4 inches to the mile (1:15,800). Fieldwork by Robert E. Slota, W. W. Anderson, R. Church, G. D. Garvey, F. H. Haverland, H. Strelow, and others.

Ecology and economics

It is an interesting fact that two common words—*ecology* and *economics*—representing two major areas of concern to modern society were derived from the same origin. *Oikos* is a Greek word meaning household. Ecology literally means the *study* of the household. Economy literally means the *state* of the household.

Ecology has developed rather recently as the science that deals with the relations of living things to each other and to their environment. Economics is defined by Webster as the science that deals with the production, distribution, and consumption of wealth.

Our privately owned grazing resources cover more than 625 million acres. "That ain't hay"—hayland occupies another 78 million acres. Managing this major segment of our environment for the good of man requires the careful application of both ecological and economic principles.

The branches of applied ecology known as range management and agronomy plus economics are vital functions in the conservation and development of grazing lands. They are important elements in the technical competence of the Soil Conservation Service.

Grazing lands are complex in their combination of kinds of soils, climate, vegetation, animals, and the needs of people. They vary from complicated native plant communities on some rangelands to improved pastures consisting of stands of only one kind of plant. Each cooperator needs and uses a combination of the kinds of grazing land he can improve or develop with his own resources to meet his yearly needs. Properly developed and managed grazing lands are important for livestock forage, wildlife habitat, watershed management, and wide open spaces for pure enjoyment.

Last summer I made a 6-day trip to study our assistance to cooperators on grazing lands. We reviewed procedures for working with farmers and ranchers on grassland management. We visited with cooperators and observed the conservation programs they had

applied. All were enthusiastic about the economic benefits of their conservation efforts.

Where ranchers had practiced proper grazing use and used planned grazing systems, plant cover showed noticeable improvement. Erosion and soil losses were reduced. We saw examples of healing gullies and reduced sheet erosion, even near ponds and wells where livestock concentrate.

Cooperators told me that technical assistance in grassland and livestock management practices was essential to them. They have found that without sound grazing management, practices such as brush control, seeding, stock-water developments, and fencing often are of marginal value.

The benefits to important wildlife species from conservation work were striking. We saw many deer, turkey, quail, and doves on the conservation ranches. Many cooperators are realizing substantial economic returns from wildlife.

I was most impressed of all by the obvious understanding ranchers had of range conservation principles when they had been properly assisted by our conservationists. This understanding was evident both in their comments and in the improvement of their rangeland. Unless we develop such understanding with cooperators, needed land treatment and management is not accomplished.

It is our responsibility to be competent in the physical, biological, and economic sciences and technologies applicable to grazing land so that we can assist cooperators to develop and manage them properly and profitably.

We can say that our objective is to encourage the management of grazing land resources for a satisfactory level of production and income in the short run while improving resources or protecting future options for their use in the long run.

The articles in this magazine together with our annual report of conservation accomplishments illustrate the application of these principles by district cooperators with SCS assistance.

Kenneth E. Gant



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District increases grass through Great Plains Program

The Great Plains Conservation program has helped the ranchers of Todd County Conservation District of South Dakota convert some 4,700 acres of sandy textured cropland to grassland by cost-sharing for seed and seeding. SCS furnished technical assistance.

Seventy-three participants have signed contracts on farms and ranches ranging in size from 640 to more than 2,000 acres and covering a third of the district's area. Twenty-five of the contracts are with Indian land operators, with the Bureau of Indian Affairs and the Soil Conservation Service jointly assisting in planning and applying the conservation programs.

Much of the land in Todd County District is sandy textured. It erodes readily when left uncovered and exposed to the wind. Intensive cropping of these sandy soils has proved hazardous.

Nearly 3,000 acres has been converted to introduced pasture mixtures of intermediate and crested wheatgrass with alfalfa. The cool-season grasses lengthen the "green grass" grazing season and permit deferment of the native ranges composed mainly of warm-season grasses that begin growth in late spring.

Todd County Great Plains Program participants have interseeded 4,400 acres of low-producing "go-



Owner Claude Lamoureux, whose Great Plains contract was the first one prepared in the Todd County Conservation District, views with Feed Dealer Gene Hutchison a well and water-storage facility.

back" land with native grass mixtures. "Go-back" land is former cropland with low-producing plant cover persisting because of grazing pressure.

Through interseeding and proper management, 9,100 acres of rangeland in poor to fair condition is being restored to good and excellent condition and now provides

grazing for around 600 more cattle. Proper grazing use has resulted in forage for another 1,500 head. Other management practices include 156 livestock watering facilities, 14,000 rods of fencing, and 250 acres of field, farmstead, and feedlot windbreaks.—GILBERT G. BIERWAGEN, district conservationist, SCS, Mission, S. Dak. ♦

35/7 February 1970

Conservation districts
in the seventies

Public recreation areas

Soil Conservation Service
U.S. Department of Agriculture

Soil **Conservation**

Devoted to the wise use of land and water resources



Two years ago this month *Soil Conservation* reported on parallel studies by the National Association of Conservation Districts and the U.S. Department of Agriculture of the desirable direction for the conservation movement in the years ahead.

This month, Norman Berg from his vantage point as associate administrator of SCS takes a look (p. 147) at progress down the road charted by the so-called "District Outlook" report. He terms it "dramatic."

Contributed articles from Illinois (p. 152), Louisiana (p. 154), Wisconsin (p. 155), and Alabama (p. 159), document some of the many ways districts are moving into new fields of activity that improve the quality of the total human environment.

Recreation

Public recreation facilities created by small watershed projects are another example of the trend to broader purposes in conservation programs.

Recreation Specialist Ralph Wilson details a good sampling (p. 150), of the kind of resulting fun areas that supplement public parks on the one hand and private rural recreation enterprises on the other.

Sediment

Maryland's pioneering steps in suburban sediment control take a firmer stance in regulations for the Patuxent River watershed described (p. 156) by State Conservationist Ed Keil.

COVER: Increased values are placed on secluded and scenic places as conservation districts broaden their concern for quality of environment. Dripping Springs is on a recreation ranch in the Delaware Soil and Water Conservation District in Oklahoma.



Soil Conservation

Devoted to the wise use of land and water resources

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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What's new with conservation districts

By **Norman A. Berg**
Associate administrator, SCS

A district board meeting

The conservation district's governing board was in regular session. Two supervisors—one a business executive—reported on progress of the new small watershed project and the county's erosion control program for building development. A local builder, who had been asked to attend, commented on sediment-control measures for his project. An educator, another visitor, described his work to put more conservation into the school curriculum. A third supervisor reported on his recent meeting with regional planning officials. The SCS district conservationist's report told of a large increase in sod planting of corn in one part of the county and storm drainage control work with engineers of a new shopping center in another area.

Conservation districts have changed dramatically in the past decade.

An agenda such as that described in the adjoining column would have been hard to imagine as regular business for the governing board of a soil and water conservation district 10 years ago. Hundreds of boards would take it in stride today.

The "now" issues

Responding to the "now" needs of conservation, districts have broadened their interests to include such matters as urban erosion, watershed protection, water and air pollution, and town and country planning. They are combining these activities with traditional conservation work on farmland. In many cases, state legislatures have supported this trend by enlarging their legal powers and increasing their available funds.

Districts today are interested in the whole spectrum of resource development—soils, water, wildlife, land use, and resource planning. They are interested in the quality of the environment—cleaner water, clearer air, more beautiful surroundings. They recognize that town and country are tied together both physically and economically and that owners and users of land have a

legitimate interest in improving the environment. In the America of the 1970's all of us live downstream, and downwind, from somebody else.

Planning activities

In many states, districts are working closely with regional or other substate planning districts and planning groups. They supply soil, water, and other resource information, including evaluation of local outdoor recreation potentials. In addition some district board members are members of their local or regional planning committees.

Some districts assist builders and developers in finding good sites and in planning needed sediment- and erosion-control measures during the construction period. For example, the "new towns" of Reston, Va., and Columbia, Md., are cooperators with their local districts, and Dulles International Airport, near Washington, D.C., received extensive help before and during the construction period.

In Georgia, almost all districts have entered into three-way memorandums of understanding with the 18 multicounty area planning and development commissions and the Soil Conservation Service. This has significantly increased the use of

soil and water resource inventories and conservation knowhow in the development of land use and water and sewer plans.

In the Chicago area, six soil and water conservation districts established a Natural Resource Service Center. Here, staff members from state and federal resource agencies are housed together to provide prompt, coordinated help with resource problems that cross district lines.

District assistance to nonfarm land and water users and to local governmental units has not, overall, meant a reduction in assistance to farmers and ranchers. California is now the Nation's most populous state and one of the fastest growing. It has had a tremendous increase in requests for district help in urbanizing areas. Yet, in fiscal year 1969, 1,500 farmers and ranchers received help in making conservation plans for their individual properties.

Similarly, the SCS, working primarily through districts, gave assistance to 80 to 90 percent of the planning commissions in Ohio during the sixties. At the same time, Ohio dis-

tricts annually give conservation assistance to approximately 35,000 cooperators, the overwhelming percentage of whom are individual landowners.

Watershed and RC&D projects

Districts are cosponsors of more than 1,530 small watershed projects currently being planned, being built, or already finished, plus more than 1,300 other project applications awaiting action.

Districts are also active in planning or operations on 68 Resource Conservation and Development projects and have helped develop another 50 applications.

By contrast, in February 1960, there were *no* Resource Conservation and Development projects and only 526 small watershed projects in the planning or operations stage.

Working with more people

As citizen concern for the environment increases, district leaders are working with more and more varied groups of people, including mayors, county and regional planners, builders and developers, school boards, and women's and youth groups. For example, nearly 300 schools in Michigan alone are district cooperators and have received technical assistance in establishing outdoor conservation laboratories.

And more money

As the value of their work becomes more obvious to state and local groups, districts receive increased appropriations. For 1960, the total funding from state sources for conservation district programs was about \$5½ million. In 1970, it will be nearly \$31 million.

In the 10-year period 1958-68, nonfederal (state, local, and private) funds for district work increased almost 400 percent.

Legislative changes

District support was extremely helpful in securing passage of Public Law 91-118, which extends Great

Plains Conservation Program contracting until December 31, 1981. The new legislation recognizes the role of districts in carrying out the total program and now provides (by law, instead of policy alone) that cost-share contracts will be based on conservation plans developed in cooperation with districts. The new legislation permits cost-sharing and technical help for fish and wildlife developments, recreation facilities, and the abatement of agriculture-related pollution.

On a state-by-state basis, there has also been considerable legislation that affects districts.

As of January 1, districts or subdistricts in 20 States have some powers of eminent domain. In 17 states, they have the power to levy assessments; in 25 states they have authority to borrow money; and in 12 the authority to issue bonds.

In 1969 alone, there was a substantial increase in authorization of state and county funds for district purposes. At least 15 states increased or authorized for the first time financial aid to conservation districts. In Minnesota, county commissioners can support districts with up to \$15,000 a year per district.

Montana districts can increase their funds through collecting fees, issuing bonds, and borrowing money, while their county governments may levy assessments of 1½ mills for the benefit of districts in general and up to 3 mills for projects.

Districts were given broader powers to deal with renewable natural resources in more than half a dozen states last year. Several made changes in the elective process for district leaders, including changes in the number of supervisors and in their qualifications. Some states now require that one or more supervisors be urban residents.

In some states urban areas have been a part of districts from the beginning; in others they have been brought in by special legislation. For example, Mississippi in 1968, brought 80 towns and cities into

The name of the game

The original state enabling acts under which conservation districts were established called them Soil Conservation Districts. Currently, 14 states and Puerto Rico have Soil Conservation Districts; 30 states and the Virgin Islands have Soil and Water Conservation Districts; four have Conservation Districts; one has Natural Resources Conservation Districts; and another will change to Natural Resource Districts in the future. In Alaska, the entire state is a district, making Soil Conservation Subdistricts of the individual operating units and also making Alaska far and away the Nation's largest conservation district.

NACD's District Outlook

In 1966, the National Association of Conservation Districts published a booklet, "The Future of Districts." It recommended that districts:

(1) Represent all the people and community interests of their area in ascertaining, and responding to, conservation needs.

(2) Develop resource development programs for all of the people.

(3) Involve all the people, through appropriate representation, in the decision-making process relating to resource conservation and development.

(4) Accept and carry out responsibilities, including financial responsibilities, in connection with resource programs.

Districts are doing this, state by state, by their own methods, and on their own time-tables. More than 30 states have now formed permanent District Outlook Committees, and 2,725 out of 3,017 districts have formally updated their programs.

districts, and more than 30 of them have since received conservation help.

In nonlegislative action, Detroit, the Nation's fifth largest city, last year became part of a new soil conservation district formed to help solve land use and water problems in that rapidly developing region.

District leaders in all states are operating expanding, vigorous, and exciting programs that indicate the trend of the times. One of the most interesting is Nebraska, where the legislature has taken action to consolidate all natural resource activities into one system of operating districts. Maryland's pioneering sediment control regulations are described in another article in this issue (p. 156) as are Louisiana's agreements between conservation

districts and other local units of government (p. 154) and Alabama's updated district programs (p. 159).

Nebraska

By a vote of 29 to 9, the Nebraska Legislature recently passed an act to eventually consolidate the state's 150 soil and water conservation districts, watershed and watershed conservancy districts, watershed advisory boards, watershed planning boards, and mosquito abatement districts into 25 to 50 natural resource districts. The new act now calls for these districts to begin operations in 1972.

The districts, to be organized on the basis of "common problem" areas, will have boundaries determined by the State Soil and Water Conservation Commission.

Every acre of land in Nebraska will be included within the new district boundaries, and the districts will have the powers of taxation (up to a maximum of 2 mills ad valorem), eminent domain, and contracting. District responsibilities will be to: (1) Prevent and control erosion, (2) control floods and prevent floodwater and sediment damages, (3) conserve soil, (4) provide water supply for any beneficial uses, (5) control pollution, (6) conserve and develop ground and surface water, (7) provide for solid waste disposal and sanitary drainage, (8) improve drainage and rectify channels, (9) develop and manage fish and wildlife habitat and recreational and park facilities, (10) carry out forestry and range management programs, and (12) abate mosquito problems.

The legislation, which was supported by the Nebraska Association of Soil and Water Conservation Districts, will consolidate natural resource functions into one local unit of government and increase its ability to meet the challenges of conservation and resource development in the 1970's. It will be interesting to watch development in Nebraska's natural resource districts during the next decade.

In the 1930's and 1940's, the immediate conservation need was stabilization and improvement of agricultural land. In the 1950's and 1960's, water and sedimentation problems and the needs of rural communities were spotlighted through small watershed and RC&D projects.

The coming decade

The 1970's may well be the decade of broader realization, by both ourselves and the American public, of the "one-ness" of all of these human and environmental problems, and of the urgent need for coordinated town and country planning to meet and solve them. ♦

Interior and Agriculture for national trails

Criteria to establish national scenic and recreation trails under the National Trails System have been announced jointly by Secretary of the Interior Walter J. Hickel and Secretary of Agriculture Clifford M. Hardin.

Basic procedures for setting up national scenic and recreation trails were spelled out in Public Law 90-543, approved October 2, 1968. In that act, Congress designated the Appalachian Trail and the Pacific Crest Trail as the first components of the new National Trails System.

The Appalachian Trail is administered by the National Park Service of the Department of the Interior and the Pacific Crest Trail by the Forest Service of the Department of Agriculture. Fourteen other trail routes were designated by Congress for study and possible future inclusion in the trails system.

The nationwide system will consist of two general trail classifications: National Scenic Trails and National Recreation Trails. Criteria adopted by Interior and Agriculture call for national scenic trails to have superior scenic, historical, natural, or cultural qualities with maximum outdoor recreation potential. ♦

Public recreation areas meet a need

By Ralph C. Wilson

Recreation specialist, SCS, Washington, D.C.

During its first 60 days of operation, the Lake Jericho recreation area near New Castle, Ky., attracted more than 15,000 paid visitors.

Such heavy use in a state rich with opportunities for water-related outdoor recreation and an outstanding state park system demonstrates the need for more recreation facilities even in a land of plenty.

Lake Jericho is an example of how people at the local level are meeting this need through small watershed projects. The 300-acre development beside one of six flood-prevention reservoirs in the Little Kentucky River Watershed Project is complete with such facilities as camping and picnicking accommodations, launching ramps and boat docks, shelter and sanitary buildings, roads and parking lot.

It was installed under provisions of a 1962 amendment to the Watershed Protection and Flood Prevention Act authorizing federal assistance for recreation facilities and water-resource improvements in small watershed projects.

Most of the local costs of the development, which must be self-supporting, were financed by a 40-year \$240,000 loan from the Farmers Home Administration. The sponsors expect to repay the loan with returns from concessions and a user fee. The Soil Conservation Service cost-shared the installation of basic facilities, enlargement of the water-storage structure, and land easement for recreation purposes to more than \$250,000.

Lake Moffit, 150 miles to the southwest in Union County, is another example of such local recreation development. Facilities provide opportunities for camping, picnicking, swimming, fishing, and limited water sports on a 50-acre lake. Total cost of the 136-acre development was \$292,973, of which \$145,230 was financed by the Cypress Creek Watershed Conservancy District through a FHA loan.

Similar examples are Montgomery Lake and Park in the Prairie Creek Watershed Project in Indiana; the Arm Brook site in the Powdermill Watershed Project near Westfield, Mass.; and the 23-acre lake and adjoining recreation area 2 miles from Lindsay, Okla., in the Bear-Hybarger Creek Watershed Project.

And, so, the list could be continued. These all are local efforts, intended to supplement rather than compete with state and federal recreation developments.

Since the recreation amendment was enacted, a total of 161 public recreation developments and 81 water-resource improvements for recreation has been approved for

operations in 181 different watershed projects in 40 states. In addition, 13 public developments and 69 water-resource improvements for fish and wildlife have been approved in 65 projects in 29 states. When completed, these developments are expected to provide more than 15 million visitor-days of water-related recreation each year, with annual monetary benefits of \$20 million.

Most public recreational and fish and wildlife developments have been sponsored by state park and wildlife agencies and county and municipal recreation and park departments.

Under the 1962 amendment, the Secretary of Agriculture, through the Soil Conservation Service may pay up to 50 percent of the costs of (1) enlarging dams for public recreational use, (2) acquiring land rights for the larger reservoirs and adjacent land, and (3) constructing basic facilities needed for public health and safety, access to, and enjoyment of the recreation area.

Basic facilities may include such items as boat docks and ramps; beach development; bath houses; campsites; picnic tables, fireplaces

A picnic area at Lake Moffit adjoins a sand beach and swimming area.



and shelters; sanitary facilities; public water and power systems; roads, trails, and parking lots; signs; fencing; planting for erosion control; landscaping and beautification; and other similar or related items.

Although the number of recreation "developments" within a watershed is limited by the size of the watershed, there is no limit to the number of public recreation or fish and wildlife "water resource improvements." A "water-resource improvement" may be a reservoir; a lake level control structure; stream or channel improvement or stabilization, or a similar improvement for water-related recreation or fish and wildlife purposes where provision is made for public access or use.

Like Lake Jericho, Montgomery Lake and Park in Daviess County, Ind., was a success from the beginning and continues to gain in popularity. Since the 26-acre lake and 13-acre park were opened to the public on the Memorial Day weekend in 1967, their use has exceeded all expectations. The demand for camping and swimming has been so great that the local sponsors, the town of Montgomery and the Ruritan Club, have increased the beach area by 50 percent and have installed additional camping spaces. The development has been financially self-sustaining.

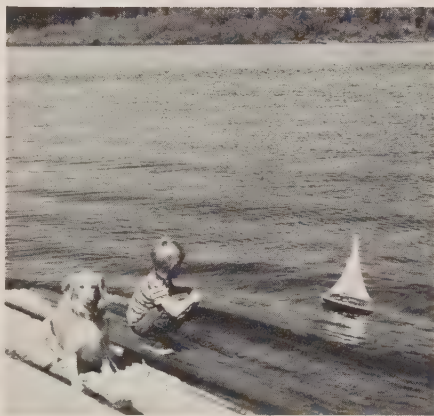
The city of Westfield, Mass., last year purchased an additional 8.7 acres of land at the Arm Brook multiple-purpose structure in the Powdermill Brook Watershed Project. This increased the recreational area to 48 acres. Attendance records show that up to 4,000 bathers weekly use the facility. The lake has provided many hours of fishing for people of all ages. The barbecue and picnic facility on the newly acquired land has accommodated up to 600 people at one time from surrounding cities and towns. Project EPIC (Education Project to Implement Conservation—an HEW Title 3 Project) representatives have used the area as an outdoor classroom. ♦

Watershed lake draws aquatic enthusiasts in Pacific northwest

Once wild-looking and unused, Cullaby Lake, in the northwest corner of Oregon, today is a haven for thousands of pleasure-seekers.

Developed as part of the Skipanon Watershed Project, Cullaby, in the Warrenton Dune Soil and Water Conservation District, is a popular gathering place for water skiers, sports fishermen, and aquatic enthusiasts from as far away as Portland, 90 miles east.

On a good weekend, some 600 people use the area; the total reached 72,000 in 1968. Group picnics attracted more than 4,000 people in 1969 and the Astoria (speed boat) Regatta is viewed by about 2,000 each year.



Recreation development was financed through cost-sharing agreements between Clatsop County and the Soil Conservation Service under the 1962 recreation amendment to Public Law 566. Clatsop County has invested additional funds in the development.

Originally Lake Cullaby was just a 200-acre water hole surrounded by private tree farms, abandoned farmland, and public land.

Controlling the water level was the first step to a successful development of Cullaby Lake as a recreational center. Before installation of a control structure and enlargement of the stream channel, water in the lake fluctuated as much as 8 feet during the year. Now it rarely varies more than a foot. This control made it feasible to construct two concrete boat ramps, a boat basin with docking facilities, and a sand beach.

Hard-surfaced roads and parking facilities, picnic areas equipped with fireplaces, picnic tables, garbage disposal service and restrooms were installed.—DON LEACH, *district conservationist, SCS, Astoria, Oreg.* ♦

Astoria Regatta is a busy time for boaters, large and small, at Cullaby Lake.



A multicounty natural resource service center

By **Richard L. Duesterhaus**
Soil conservationist, SCS, Lisle, Ill.

"We must always be sure we are working on truly multicounty resource problems, and we insist that individual conservation districts, counties, and municipalities take full responsibility for local programs."

Conservation in northeast Illinois is developing in the tradition of Abraham Lincoln's famous phrase "of the people, by the people, and for the people."

The Northeast Illinois Natural Resource Service Center, located near Chicago, encourages people to become involved in planning solutions to natural resource and environmental problems in a block of seven counties feeling the main push of the expanding metropolis.

A central point

A nonprofit organization, the center serves as a central point for area-wide resource information and for the coordination of government and private efforts to deal with problems generated by the urban upheaval. It serves a population of 7 million people with a multitude of taxing bodies and municipalities.

The center was organized in 1968 by the five soil and water conservation districts in the counties of Cook, Lake, McHenry, Kane, DuPage, and Will. Kendall County joined as the sixth conservation district and the seventh county several months later. It is headquartered in the Morton Arboretum at Lisle.

The long range goal of the center is to offer its services as a regional coordinating agency in making the best possible use of the land and water resources in northeast Illinois.

The specific long range objectives are:

- (1) Assist in the natural resource development of the Fox River Basin.
- (2) Assist local and county gov-

ernments in making the best use of federal and state funds available for conservation projects in the area.

(3) Reach the general public with natural resource information which will lead to the orderly development of the area.

(4) Delineate and evaluate possible areas for watershed development.

(5) Assist in the development of recreation and nature preserve areas on a multicounty basis.

Intent on supplementing the work of soil and water conservation districts, the center serves as a focal point for attacking areawide problems in a more effective manner. It has worked with local and regional units of government and other multicounty groups rather than with individual landowners.

Supplementing districts

"We must always be sure we are working on truly multicounty resource problems, and we insist that individual conservation districts, counties, and municipalities take full responsibility for local programs," declares Kenneth V. Fiske, executive director.

In the first year, requests for help came from the American Society of Public Administrators, the University of Illinois, the World Flower Show, National Accelerator Laboratory, and units of government and industry needing information about soil, water, and related resources.

The center is now promoting the use of soil information as a basis for fair taxation and gathering geologi-

cal information for use in multi-county planning of gravel pit rehabilitation. It has arranged with the University of Illinois for automatic data processing of natural resource facts. The aim is to set up a comprehensive retrieval system for facts about Chicago area soils, water impoundments, hydrology, minerals, and other physical features. This information will then be quickly available to any inquirer.

Counseling help

One of the functions of the center is to counsel with agencies and organizations on the availability and need to utilize natural resource information.

Technical services are provided to planners, developers, public officials, and private concerns by appropriate agencies, many of which have memorandums of cooperation with the center. Cooperating agencies include the seven conservation districts, the U. S. Soil Conservation Service, Illinois Division of Forestry, Illinois Geological Survey, Morton Arboretum, Illinois Division of Conservation Education, Illinois Water Survey, Illinois Division of Soil and Water Conservation, Association of Illinois Soil and Water Conservation Districts, Illinois Division of Waterways, Northeast Illinois Planning Commission, Cooperative Extension Service, Illinois Water Pollution and Conservation Commission, and the McHenry County Board of Supervisors.

Two agencies, the SCS and the Illinois Division of Forestry, have offices at the headquarters. As time goes on, it is expected that other agencies will take up residence there.

Eventually, the center hopes to have officed at the headquarters representatives of cooperating agencies such as a full-time conservation education coordinator, an Extension specialist in natural resources, and specialists in fish biology and game management, recreation development, and nature center planning.

Fiske is the only full-time mem-

ber of the staff. He meets quarterly with the board of directors made up of the chairmen of the seven conservation districts plus representatives of some state and local agencies. Other agency representatives serve in an advisory capacity. The basic problem, according to Executive Director Fiske, is getting a solid procedure for financing. The two major sources of funds for the first year were the State of Illinois and the Regenstien Foundation, a Chicago institution interested in the natural environment.

The SCS is represented on many regional committees and works with all the planning commissions in the area. Personally, or by phone, its conservationists work with officials, developers, and landowners singly

or in groups throughout the Chicago area. Mapping of soils is proceeding rapidly; the job is completed in three counties and nearly done in two more.

When necessary, the Service Center can act quickly. A recent example was an \$80 million housing project planned on soils of doubtful quality for adequate sewage disposal by septic tanks. An emergency request came to the center, and factual data on soils, water, and geology were made available to the developer and to the officials who had to make the zoning decisions. The developer offered to alter his plans to fit the existing resources.

Sponsors of the center and the conservation district directors are pleased with operations so far. ♦

District celebrates jubilee

Conservation and beauty share the spotlight at Harlan County's Conservation Jubilee each September.

People from five small towns in Nebraska gather for the 1-day celebration that begins and ends with all eyes on lovely candidates for Queen of the Conservation Jubilee.

The event is sponsored by the Alma Chamber of Commerce and the Harlan County Soil and Water Conservation District.

Pageant originator Bill Richards, former president of the National Association of Soil and Water Conservation Districts and former chairman of the district board, presides over a kick-off luncheon for candidates, sponsors, and judges.

There were six entries in the first jubilee contest 13 years ago. This year 22 young ladies vied for the honor and rode through downtown Alma on individual floats. More than 5,000 people lined the streets of the county seat for the parade.

While celebrators of all ages enjoy games and other performances, would-be queens are judged on their poise and interest in community affairs. This year Miss Nebraska was one of the judges.

In the evening, after a beef barbecue, the district announces the honor conservation family of the year and five outstanding conservation families. Conservation essay contest winners collect cash prizes. This year, the Goodyear Award to the outstanding district in the western half of the state was presented to the Harlan County District at the affair.

When the evening gown competition is over and the queen and her six-member court have been announced, teens and adults finish up the festivities at separate dances.

The district's annual report is part of the jubilee's printed program. Radio and newspaper coverage provide additional records of the county's biggest annual event. ♦



Left, the mayor and the airport commissioner of Minden plan conservation work on the airport with the SCS district conservationist.

Louisiana districts sign agreements with cities and parishes

“Say, can you folks help with soil problems on city land?” is the way Farmerville, La., Mayor J. G. Elliott put it when he talked to SCS District Conservationist Clint Smith.

“Sure, we can,” said Smith, “but how about becoming a cooperator with the D’Arbonne Soil and Water Conservation District first. The board meets next week.”

Sure enough, Mayor Elliott was there and signed an agreement with the district making Farmerville one of more than 20 cities in Louisiana to do so.

According to the latest tally, 25 parish police juries also have signed agreements with 13 of the state’s 29 districts. Several school boards and local development commissions also have working agreements with their conservation districts. More than 30 projects dealing with soil and water management are underway as a result of parish and city agreements.

For nearly 40 years the district-

SCS team has helped farmers plan and put conservation on the land. In Louisiana there are some 55,000 cooperating landowners with conservation plans on more than 11 million acres.

Responding to the growing demand from nonfarm land users for conservation assistance, the Louisiana Legislature in 1967 amended the state’s soil and water conservation law to bring cities and towns into districts. District leaders and conservationists started that fall to meet with city and parish governments and other groups to discuss conservation needs.

All conservation districts have agreements with the Louisiana Forestry Commission. The State Parks and Recreation Commission has signed an agreement with the State Soil and Water Conservation Committee and is now developing an agreement with each district.

Mayor Elliott is getting the help

he asked for. The Soil Conservation Service has made a soil survey of the town’s new industrial site and is helping locate a site for garbage disposal. The district is providing information and assistance on erosion and water management problems in the town and is planning to help with beautification projects.

The agreement between the Beauregard Parish Policy Jury and the Calcasieu Soil and Water Conservation District resulted in SCS making a survey of roadside erosion in the parish and locating soils suitable for sanitary landfills.

The town of Coushatta signed an agreement with the Saline Soil and Water Conservation District in 1968. SCS helped locate a 20-acre oxidation pond for the town’s sewage disposal system. After the structure was designed by a private consulting engineer and construction was completed, SCS helped sod and seed the levees to keep down erosion. The pond is almost complete and soon

sewage will no longer be discharged into nearby Red River.

The town of Minden used district help to put in two water-control structures and to shape and seed an eroded area at the city airport. These were project measures in the Bossier-Webster RC&D Project and received technical and financial assistance from RC&D funds.

In Lincoln Parish the district and SCS are working with the police jury to make trial plantings on parish roads for erosion control.

In the rice country at Welsh the district signed an agreement with the town, and the SCS counseled with town officials on solutions to drainage and erosion problems. At Homer the town became a cooperator with the district and received technical assistance in solving a drainage problem on the Homer Golf Course.

M. W. Scanlan, Jr., president, Louisiana Association of Soil and Water Conservation District Supervisors and chairman of the Association's District Outlook Committee, says Louisiana districts are looking for new opportunities for service. These are a few examples of how they are doing it. ♦

Forestry to use space program

The National Academy of Sciences has found a way to use space technology in the world forestry program and believes that all of the earth's population can benefit from the plan. NSF feels that space satellites could be used to gather information about the world's timberlands.

"The expanding population and economic growth of the United States and of the world require the continued development of the world's forest resources," said a National Science Foundation study panel. Reliable information about this resource should be obtained not only in advance of its exploitation but also as its protection and management are intensified. ♦

Board creates link with local youth

What does it take to fire up young people about problems that are literally in their own backyards? What is there about conservation that will turn them on?

Here in Grant County, Wis., we let youth strike its own spark by creating a junior board of soil and water conservation district supervisors. This group of young people is invited to help the district governing body bring conservation to the area.

"Ours is the first junior board in Wisconsin, although other states have them," said Alfred Klein, chairman of the Grant County board.

Junior board members are recommended by their 4-H club leaders, vocational agriculture instructors, and those who know of their Future Farmers of America activities. Each is appointed for 2 years with possible reappointment to a 1-year term. In Grant County there is an equal number of junior and district board members—14 in all.

Said John Adametz, 1968 junior supervisor chairman, "Our main thrust will be to work with other youth organizations on the conservation of our natural resources."

Coached by the district conservationist, junior supervisors make out work plans, arrange youth activities, and participate in the district's information and education program. More than 75 percent of these ideas come from the boys themselves. Most of the time the adult board agrees.

The junior board members have helped set up, host, chair, and judge annual 4-H conservation speaking contests with as many as three sessions at a time before audiences of 200 or 300 people. They also guide 4-H conservation projects in wildlife management, soil and water re-

source planning, and nature study.

During FFA activities, junior supervisors may organize speaking contests or help run events such as land judging. They explain rules, act as guides, and assist the district judges. When they talk to 4-H or FFA audiences, junior board members may use SCS movies or slides showing local situations.

Boy Scouts and Girl Scouts rely on this service when planning conservation practices for merit and proficiency badges. By joining with the junior supervisors in an activity, Scouts can help apply practices rather than just hear about them.

Junior board members are often invited by school teachers to help present conservation programs in natural science classes. The boys visit other schools and hold outdoor lab sessions.

"We find that youngsters remember stories," one member said. We tell them how Indians used birch bark for canoes, how the honeylocust is attractive to bees for making honey, and the way liquid turpentine comes from pine. Training can be more technical in high school. We can even get into economics. If soil types are discussed, we try to take students to typical areas."

"Participation is a must. We arrange programs so that each person will get a chance to do something." The junior board of supervisors has found that its unique approach to public information is an asset to conservation programs in the district.—JAMES K. TEW, *district conservationist, SCS, Lancaster, Wis.* ♦

Farm wage workers

Of the total number of wage workers in the United States in 1948-49, farm wage workers on the average constituted 65 percent. By 1966-67, farm workers comprised only 27 percent of the total. In 1948-49 there were 3,946,000 farm wage workers compared to 2,920,000 in 1966-67.

Mopping up on the menace of MUD

Maryland legislature
enacts sediment-control
measure for urbanizing
area; authorizes county
ordinances

By Edward R. Keil

State conservationist, SCS, College Park, Md.

Builders and developers in the Patuxent River watershed of Maryland, including the expansive "new town" of Columbia and adjacent rapidly urbanizing areas, are subject to sediment-control regulations enacted by the 1969 General Assembly.

Besides the mandatory measures applying specifically to the seven-county Patuxent drainage area, the legislature authorized all counties to enact ordinances aimed directly at the "menace of mud," chief destroyer of water quality, in subdivisions throughout the state.

The Patuxent measure is patterned after the anti-sediment campaign launched initially in Montgom-

ery County, a suburb of the District of Columbia (*Soil Conservation*, November 1966).

Four other Maryland counties have adopted similar programs, and three others are considering "stop mud" regulations.

The state's requirements for builders in the Patuxent watershed extend sediment controls beyond subdivisions for housing to include commercial and industrial facilities. The law also embraces highway construction by the state, counties, and municipalities.

Operators must file sediment-prevention plans with local land use agencies and obtain approval of the soil conservation districts involved before building permits are issued. The Patuxent legislation also provides strict controls on sewage pollution to be administered by county health agencies.

Maryland's advances in curbing sediment damage result from a unique melding of rural and urban points of view, plus related know-how. Soil conservation districts and the Soil Conservation Service have long offered skills in agricultural conservation. Enlightened builders and developers have sought damage-abating methods suitable to their operations and the economics of their trade. County planning bodies and governing officials reflect the growing communitywide interests in



Above, faulty design of a roadside ditch induces bank erosion.

Below, a concrete lining permanently stabilizes a drainage channel. Far right, a basin traps sediment before it leaves a construction site, and the builder uses it for fill material.

improved environment for family life.

A sense of responsibility toward vital natural resources has prompted cooperation among Maryland urban and suburban land operators. Home builders' associations have freely endorsed sediment-control practices even in unregulated areas. Trade spokesmen openly voice satisfaction



A housing development under construction (upper left) without temporary sediment controls becomes a quagmire during a rainy spell. In contrast, carefully landscaped lots on rolling terrain are well stabilized with storm waters adequately handled by paved gutters and piped outfalls.



with the more attractive, saleable properties resulting from applied conservation.

Results of the program are visible on hundreds of widely scattered sites—especially along the axis of heaviest construction between Baltimore and Washington. Techniques are adapted to the precise soil and water conditions at each location.

Basic requirements of an effective sediment-control program on building sites include: (1) Saving natural vegetation wherever possible; (2) avoiding unnecessary disturbance of soil; (3) early installation of permanent storm drains and roads; (4) planting of temporary vegetation on denuded soils; (5) installing permanent vegetation speedily after construction; (6) construction of basins to trap sediment onsite; and (7) engineering to take care of marked increases in water runoff that follows development.

Beginning with Montgomery County's pioneer program, the Soil Conservation Service has assisted conservation districts in setting standards and specifications for sediment-control measures. As experience accumulates, these are refined to fit the practicalities of construction as well as improving their effectiveness in preventing resource damages.

Tangible benefits of the effort can already be seen at a number of sites where construction proceeds with reduced problems of mud and dust. Montgomery County leaders point to two new multipurpose lakes in Rock Creek Park completed only after sediment control for the small watershed project was put into effect.

Research now being conducted by the U. S. Geological Survey in Rock Creek and Anacostia River watersheds soon will provide more exact answers as to effectiveness of sediment controls. Other studies are evaluating the effects of individual practices and testing the use of flocculant compounds as a means of desilting water and reducing turbidity in streams.

Interest in sediment control is turning to action in nearly every soil conservation district where urbanization is underway. Marylanders are heartened by the action of the 1969 legislature and in evidence of growing support for making the Patuxent sediment-control requirements statewide. ♦

District leader sets fast pace

The president of the Missouri Association of Soil and Water Conservation Districts, André Luys, attained that position of prominence in 4 years of conservation activity.

In 1964, "Andy" helped organize the Jasper County Soil and Water Conservation District and was promptly elected chairman of its board of supervisors. In 1968, he became head of the state organization.

During those 4 years his district won two newsletter awards and sponsored one of the largest conservation poster contests in the Nation, with more than 3,000 entries each year. Conservation field days, radio, television, and newspapers were used to promote con-



servation. In 1968 the Jasper County District was the Goodyear contest winner in Missouri.

Luys naturally practices conservation on his own farm, having built a diversion, silting basin, waterway, terraces, farm pond, and established pastures and windbreak-wildlife areas. He has served as treasurer of the County Extension Council and as a state ASCS Committee man.

During 1967 Luys was active in the formation of the Southwest Missouri Resource Conservation and Development Project, and now is vice-chairman of its 50-member steering committee. That year he was honored by the local Farm Bureau as "Farmer's Friend of the Year."

In his talks to civic clubs, district meetings, and other organizations Luys says, "Our creator gave us a limited amount of resources, and as our population grows we must be ever mindful of our duty to conserve these, especially our soil and water." ♦

Computers speed solution of wind-erosion problems

Computers may bring increased speed and accuracy to the search for solutions to the age-old problem of wind erosion.

By using a wind-erosion equation programmed for computer solution, researchers have been able to calculate annual soil loss as influenced by such factors as climate, field roughness and length, and vegetative cover.

Results of computer analysis can be used to determine necessary changes in field conditions to reduce erosion potential. Alternative practices can be evaluated quickly and simultaneously for comparative cost and effectiveness.

The high-speed approach to wind-erosion data studies was explained by Dr. E. L. Skidmore, Agricultural Research Service, Manhattan, Kans., at the 1969 annual meeting of the American Society of Agronomy in Detroit, Mich. ♦

District's updated program extends service to nonfarm land users

By E. L. Norton

District conservationist, SCS, Brewton, Ala.

An updated long-range program has identified new areas of service for the Escambia County Soil and Water Conservation District in Alabama.

The broadened program includes technical assistance to units of government, planning commissions, and groups by providing resource data and suggesting conservation alternatives for sound use and treatment of nonagricultural land.

The 615,680-acre district is basically an agricultural county. According to Extension Service estimates, Escambia County's gross agricultural income of \$12.5 million in 1968 ranked 19th in Alabama.

The revised program continues to emphasize assistance on rural land

but provides for the growing number of land users near to and within municipalities and builtup areas. The need for soil and water conservation work on land in all uses became apparent during 1968 while the board of supervisors was considering a revision of its program.

In 1968 the conservation district board of supervisors and city officials of Brewton discussed the use of natural resource information and technical assistance as an aid in developing a long-range comprehensive plan for the city.

The Soil Conservation Service is preparing soil survey information including maps identifying the location of each soil, descriptions of the soils, and tables showing limitations

and hazards of each soil for various uses. Interpretations will be made for the soils for such uses as residential sites, septic fields, sewage lagoons, sanitary landfills, parks, and trafficways.

Brewton is making use of the information in evaluating an area for a sewage lagoon, and selecting a site for a sanitary landfill.

The cities of Atmore, East Brewton, and Flomaton have planning needs similar to Brewton's, and the conservation district's revised long-range program provides for assistance to these municipalities. It also anticipates working with the South Alabama Regional Planning Commission, the county board of commissioners, and community groups.

The supervisors realize that problems and potentials of land resources are not limited to any one type of land user. Realizing that the general public needs to understand the need for a strong soil and water conservation program, the board has published the updated program. It will be distributed to educators, county and city officials, planners, and other leading citizens. ♦

A gutter and street in Brewton caved in where the sandy soil was inadequate to support the asphalt, and another street flooded during a summer rain. The city's soil map delineates such hazard areas for the guidance of future developers.



More water for centuries-old irrigation systems

Improvement of two irrigation systems has changed the future outlook for 49 families in Cebolleta and Bibo, N. Mex., on the east side of Mt. Taylor.

This area was the home of Indians before the Spanish occupation. The communities have remained almost isolated down through the years. An uranium strike nearby at the Jack Pile Mine in 1954 increased the need for better roads. Then an all-weather road was built to the communities in 1962, and in 1968 the first telephone was installed.

For nearly 200 years the people in the communities have rebuilt and maintained the irrigation systems. Many days of hard labor went into upkeep and repair of the systems each year.

To improve these irrigation systems, the people petitioned themselves into the Lava Soil and Water Conservation District in 1965. The Lava District supervisors gave the

projects top priority. Investigations and surveys for design work began immediately. Some steps took more time, such as getting proper storage rights and reaching agreements among the Soil Conservation Service, Agricultural Stabilization and Conservation Service, and the state engineer as to where and how the jobs should be done.

The needed diversion dams are made of concrete. Each irrigation system has a 10-inch plastic pipeline to convey the water from the diversion to the storage reservoir, and each reservoir holds 50-acre feet of water. This storage capacity is about double the original storage capacity for Bibo and about five times that for the Cebolleta system.

The completed projects will make

it possible to use water more effectively by making it available during the growing season when it is needed most. As much as 50 to 100 percent more water will be available at this critical period.

While these projects will not solve all the problems facing these communities, they will help. Home gardens and orchards help supply food. Alfalfa, oats, and barley are also grown. There is a potential future in a specialized crop for the area—chili grown there because of its special flavor.

More work needs to be done, fields to be leveled and ditches lined to make the most efficient use of the water available.

"We have made a good start, and I hope we can continue to improve our systems until we can save all the water for our crops," said Rosendo Marquez, president of Cebolleta Grant, where the communities are located.—JOHN BONOMO, JR., *district conservationist, SCS, Grants, N. Mex.* ♦

The old reservoir (lower right) was maintained during construction of Cebolleta Reservoir to hold water for sprinkling the new fill.





Conservation in action . . .

Recreation center hits the mark

North Carolina

Bull's Eye Recreation Center, part of a 350-acre mountain farm in Henderson County, N.C., aptly depicts the current success of privately developed, farm-based recreation facilities.

Walter L. Pace, a young farmer in the Mountain Page Community, zeroed in on his land's recreational potential during the early 1960's, then adjusted his aim with the assistance of the Henderson County Soil and Water Conservation District and cooperating agencies. Together, they designed and built a lake, bath house, cabin sites, pavillion, picnic areas, and campground.

After initial conferences with the Soil Conservation Service, Pace invited other federal and state agencies to lend their technical and financial assistance. Representatives of the North Carolina Recreation Commission, the State Board of Health, and the U.S. Forest Service visited the farm and gave Pace written recommendations in their specialized fields.

The Farmers Home Administration helped develop plans for buildings and made a loan to help with their construction and land development. The Agricultural Stabilization and Conservation Service cost-shared some of the conservation practices and approved the enter-

prise as a project under the Crop-land Conversion Program.

The Soil Conservation Service helped Pace develop a conservation plan for his entire farm, including orchard, woodland, and recreation areas. In 1963, SCS supervised construction of two lakes, a silt dam, and two diversion ditches.

Bull's Eye opened the following year, with large crowds on hand.

The recreation enterprise yielded a steady income from the start. Although small at the outset, it has become a substantial part of the farm income. In 1968, the recreation income nearly doubled that of the previous year.—JOHN L. BROWN, *district supervisor, Henderson Soil Conservation District*, and L.D. CURLE, *area conservationist, SCS, Hendersonville, N.C.*

Texas

Conservation raises range condition and stocking rate

A 9-year conservation program converted H. R. Easterling's north central Texas ranch from one covered by post oak brush in poor to fair range condition to a grass range in good to excellent condition.

When he signed a Great Plains Conservation Program contract in 1961, his stocking rate was 30 acres

per animal unit. Now it is 15 acres per animal unit.

Since 1961, Easterling has:

- controlled brush on 802 acres by aerial spraying, chaining and goating, and grubbing.
- seeded 319 acres of rangeland.
- seeded 32 acres of improved pasture.
- converted 143 acres of cropland to grassland.
- constructed some 2 miles of cross-fences.
- constructed five ponds for livestock water. In addition, Easterling adjusted his livestock numbers and put into effect a rotation deferred grazing system.

Easterling's conservation success on the ranch is duplicated by his conservation efforts in the community. From 1964 until 1968, he was a supervisor of the Young County part of the Upper West Fork Soil and Water Conservation District.

A cooperator since 1952, Easterling was named Young County's "Outstanding Conservation Rancher" in 1964 and was recently recognized by the Texas section of the American Society of Range Management for having achieved excellence in grazing management.—GARY K. WESTMORELAND, *range conservationist, SCS, Graham, Tex.*



Pace's recreation center.

Colorado

Colorado stock farmer tries raising rainbow trout

Fish farming and ranching are compatible land uses. Doubters are being convinced of this at Bobby Williams' Sunnyside Trout Farm south of Durango, Colo., in the La Plata Soil Conservation District.

On his 320-acre livestock farm he irrigates pastures and fields, mostly improved forages and corn, from natural springs above his place.

In 1967, after lengthy investigation, he decided to see if the same springs could be diverted profitably through raceways for rainbow trout. The 3-year-old experiment is so successful, Williams intends to add more raceways and a pond.

An SCS biologist advised him that the spring water was of good quality for trout, and an SCS engineer advised him on the installation of a diversion system to supply cold, swift, silt-free spring water.

Williams then constructed five earthen raceways measuring 100 feet long and 12 feet wide for some 75,000 small trout. Some water is diverted to 100,000-egg-capacity hatching troughs.

Twice annually, after the baby rainbows are hatched, they are transferred to the raceways, and fed there until sold. Those not sold for restocking ponds and streams are grown to proper size and sold to

restaurants and retail stores.—E. N. MCGUIRE, *district conservationist, SCS, Durango, Colo.*

Massachusetts

Massachusetts town plans protection for sand dunes

Dune stabilization is part of a long-range program for the protection and development of the Richard T. Crane, Jr., Memorial Reservation near Ipswich, Mass.

Reservation trustees applied for assistance from the Essex Conservation District after citizens had studied the seashore's current condition and ecological history.

District supervisors arranged for technical recommendations by the Soil Conservation Service and the University of Massachusetts. The SCS Plant Materials Center in New Jersey supplied 6,100 culms of a vigorous strain of American beachgrass, 200 rugosa roses, and 7½ pounds of coastal panicgrass.

Young people from Ipswich, under the direction of Col. Charles Coates, superintendent of the reservation, have helped plant new cover that will enable dunes to withstand human traffic as well as weathering. Dune buggies and human feet had damaged original vegetation.

Garden Club members and others are working on a program to promote conservation practices, including educational nature walks for school children and the general

public as well as other projects to help protect the dunes.

Ipswich citizens' interest in the reservation's condition will continue to make the difference between devastation and preservation of their prized resource.—ROBERT N. MOREHOUSE, *district conservationist, SCS, Acton, Mass.*

Wyoming

Recreation and ranching mix well for cattleman

A vacation at Hyde Merritt's 14,000-acre Cheyenne Pass Boys' Ranch on the east front range of Wyoming's Laramie Mountains is an unforgettable experience for 12-16-year-old youngsters. It is also an example of how recreation can be adapted to cattle ranching.

Merritt started the vacation ranch 20 miles west of Cheyenne, Wyo., in 1964. He uses renovated bunk houses and homestead cabins for sleeping and living quarters. Boys eat at the main ranch house or cook out. To provide recreation, a fish pond was constructed with technical help from the Soil Conservation Service and cost-shared by the Agricultural Conservation Program.

Youngsters learn to ride, care for, and groom horses. Survival in the wilderness is an integral part of the boys' training, besides haying, fence mending, and other regular ranch duties.

Williams' feeding lot.



Planting beachgrass at Crane Memorial.



Merritt, a former Wyoming state steer roping champion, is a quarter horse judge and contractor of rodeo stock. A highlight of the boys' vacation is helping care for and trail the rodeo stock to various rodeos.

In 1967 Merritt purchased land bordering the Medicine Bow National Forest and promptly worked out a development and conservation plan as a cooperator with the Frontier Soil and Water Conservation District. Expansion of the boys' ranch was top priority; selling hunting and fishing rights and weekend cabin site leases were also part of the plan.

Renovation of facilities was a matter of economics. Choosing the right site for the cabins, however, was determined by a detailed soil survey. Improved fencing now insures compatibility for cattle and recreation users. Range management provides grass for cattle and browse for deer. A proposed dam will provide fishing and boating.

Merritt maintains that recreation and cattle ranching can mix with benefit to ranch profits.—DONALD J. HEYNE, *district conservationist, SCS, Cheyenne, Wyo.*

Kansas

Redbud beautification inspires all ages

When spring comes to Chautauqua County, Kans., residents proudly view their beautiful green hills and pastures accented by thousands of rosy native redbud trees.

For 7 years, county civic leaders have sponsored weekend Redbud Tours when the trees are in bloom. Each year thousands of visitors admire the natural beauty of the area as they drive over winding gravel roads, view valleys from hilltops, and ford clear streams. To promote beautification in other places, Chautauqua County gives redbud seedlings to tour visitors.

After rain reduced the turnout for both weekends of the 1969 redbud bloom period, the Sedan Chamber of Commerce had to dis-

pose of about 500 seedlings intended as gifts for the tourists.

Soil Conservation Technician Bill Siegrist of Sedan and the junior group of his 4-H Club found a solution. The 7- to 12-year-olds responded eagerly to the idea of planting a redbud lane along a 3-mile stretch of US-166 and K-99 highway south of Sedan.

While they planted nearly 400 trees, the 4-H'ers envisioned the pink passageway that would be enjoyed by thousands of people in decades to come. Adults drove trucks and dug holes during the cool, rainy afternoon. Cooperating landowners furnished youngsters with free movie passes.

California

Conservation remains in spite of subdivision

When Sydney Hayter turned his ranch into a family-farm subdivision, he took steps to protect his place and every new owner's investment.

The cattle-raising contractor saw to it that those who purchased 20-acre parcels in his Rancho Estates signed up with the Elsinore-Murrieta-Anza Soil Conservation District. All plan to put in permanent irrigated pasture and use the plentiful well water in race horse country near Temecula in western Riverside County, Calif.

Although most of the new co-operators are more interested in owning land or building homes, some will raise thoroughbreds where grain and potatoes once grew.

Individual conservation plans call for flood-retarding dams, irrigation systems, grassed waterways, subsoiling and pasture management. A group job to stabilize the channel of Santa Gertrudas Creek is underway by a group of owners whose land was damaged by floods last year.

Continued conservation helps this region retain the right to its Indian name, Temecula, which means "Valley of Joy."—CHARLES GERHART, *district conservationist, SCS, Murrieta, Calif.*

A bit of tallgrass prairie for all to see

A bit of tallgrass prairie like that which amazed the first Europeans to arrive in southern Wisconsin has been re-created in Lake Kegonsa State Roadside Park.

In 1965 Lorenz F. Bredemeier, SCS range conservationist at Madison, was requested by the Dane County Soil and Water Conservation District supervisors to assist Walter A. Jacobson, landscape architect for the Wisconsin Department of Natural Resources, to restore prairie appearances to 150 acres of open land near a camping area.

Bredemeier and Jacobson planned to reestablish, as nearly as possible, the three grassland plant communities that existed in the primeval prairie. Seeds that could not be purchased commercially were provided by the University of Wisconsin arboretum.

The tall grass community consisted mainly of big bluestem, Indiangrass, and switchgrass. This was established on lowland areas and on lower slopes, since these grasses would do a superior job of reducing soil loss and shading out weeds on the wetter soil areas.

An intermediate combination, primarily of little bluestem, green needlegrass, and tall dropseed, was planted on the upper slopes and hilltops.

A mixture of shorter grasses, composed primarily of little bluestem, sideoats grama, and sand dropseed, was planted near the picnic area, along roadsides, and on eroded slopes. Jacobson and Bredemeier preferred the shorter grasses for the heavy-use sites and to permit people to get a better view of the prairie park.

Today many campers use the park. Their campsites are through the wooded areas, and the grassland is used for other recreational activities. The prairie grasses in many places have grown higher than an automobile fender, the modern sequel to the pioneer's stirrups. ♦

Can conservation districts meet the challenge of our urbanizing environment?



Environment and Change: The Next Fifty Years and **Environment and Policy: The Next Fifty Years**. EDITED BY WILLIAM R. EWALD, JR. 1968. *Indiana University Press, Bloomington. Based on papers commissioned for the American Institute of Planners' two-year consultation, Part II: The Washington Conference, October 1-6, 1967. 397 and 459 pp. \$10.00; paper \$4.95 each.*

Is a national policy on the environment possible without undermining basic concepts of American life and, indeed, incentives that have made and sustained an uniquely American social and economic system?

This issue is woven throughout these discussions on meeting the problems of national growth in an increasingly urban society. The collection of papers gives wide-ranging consideration to environmental concerns that confront Americans in the half-century ahead. The authors are distinguished contributors to current thought and action on the environmental front. Equally distinguished respondents offer critical commentaries.

The book on *Environment and Change* thoroughly probes the status of our contemporary society in relation to the environment on which it has had such vast impact. Beyond a scholarly analysis and recording of present societal values, the many eminent authors project their thoughts as to future critical changes which may occur.

The wide range of subjects related to the total environment are treated in unusual depth by some 25 selected individuals.

The companion volume, *Environment and Policy*, considers questions of national policy with respect to transportation, manpower, educa-

tion, health, research, and housing, along with natural resource conservation, new institutions to meet changing needs, leisure time, and the potentials and limitations of the "possible city." The questions raised reflect the depth and complexity of the issues.

To what extent, for example, is more effective control at the national, state, and regional levels (rather than purely local decisions) possible without jeopardizing legitimate local needs?

How can regional resource planning and development be organized so as to assure local communities of reasonable determination regarding their own destinies?

How do we provide greater freedom of choice for the individual in a society where increasing leisure, more sophisticated cultural tastes, and greater demand are the rule, without infringing on that very freedom?

Is, indeed, local initiative and action adequate to prevent the steady deterioration of the Nation's waterways, the frequent misuse of the landscape, the increasing pollution of the air, and the congestion, noise, and lack of rational planning that characterize our growing cities and make them increasingly uninhabitable?

These points are relevant not only to the quality of the environment but also to the direction of government leadership and control and to basic tenets of American political, social, and economic faith.

Many answers to the multiple environmental concerns of our complex society are tendered in these volumes. But no solutions are nailed down. A flexible approach dominates the thinking in these pages.

Every level of government has a role—from the broad framework

concerns at the national level through the respective responsibilities at multistate, state, regional, and local levels. But it is left to an adequately informed and responsible citizenry how this mix is to be apportioned. It is suggested that better information gathering devices and better means of making this information helpful in understanding the issues are needed at both the leadership and general public levels.

These thought-provoking papers challenge all who are concerned about the prospects for a livable existence in the changing climate of American life. The charge is particularly pertinent to leaders and cooperators in soil and water conservation districts, Resource Conservation and Development projects, and similar groupings designed to assume basic responsibility for local and regional environmental needs.

The authors provide us with no handbook of vocational skills. Rather, they offer a challenge for serious thinkers about man and his future and a strong appeal for an interdisciplinary approach to the solution of problems that are inescapable. Anyone with planning authority, responsibility, or interest should find these treatises useful as a fundamental framework for frequent reference.—LLOYD E. PARTAIN, *assistant to the administrator*, and JAMES N. MILLER, *Information Division, SCS, Washington, D.C.*

Directory of Environmental Education Facilities. 1969. *National Audubon Society, New York, N.Y. 10028. 40 pp. \$2.*

This is a 1969 revision of the publication formerly entitled *Nature Centers and Outdoor Education Facilities*. The 356 entries include all who answered the recent questionnaire sent out by the Nature Center

Planning Division of the National Audubon Society to facilities in the United States and Canada and including those operated by federal agencies. This new listing represents part of the continuing effort by the society to identify such operations and encourage the development of new facilities.

Position of the chemical profession

Cleaning Our Environment; the Chemical Basis for Action. 1969. *A Report by the Subcommittee on Environmental Improvement, Committee on Chemistry and Public Affairs, American Chemical Society, Washington, D.C.* 245 pp.; paper \$2.75.

The subcommittee that prepared the report states that it did not set out to inform the experts who must deal daily and directly with the problems of managing the environment. Rather, they hoped primarily to buttress the technical awareness of legislators, administrators, and others who must deal with environmental problems at one or more steps removed from direct involvement with the pertinent science and technology. They also hoped to attract the interest of those scientists and engineers not now involved in such problems who may have useful ideas and work to contribute to their solutions. This report should certainly accomplish both objectives.

The report covers air and water pollution, solid waste disposal, and pesticides in the environment. Major emphasis is given to immediate use of a substantial existing reservoir of science and technology which is not being adequately exploited, according to the report. But, attention also is given to the need for additional fundamental research to provide a better understanding of the environment.

Much of the report deals with environmental matters directly related to urban and industrial devel-

opments. But agriculture's possible contributions to adverse environmental situations, as well as the effect on agriculture of environmental influences, also receives attention.

For example, the effects of air pollutants on vegetation, the role of the soil as a filter and biological medium, and the possible impact of chemicals—fertilizers and pesticides—used in agricultural pursuits are discussed.

Of special interest to soil and water conservation districts and SCS is the statement, "Perhaps the greatest source of pollution by agriculture is soil transport of runoff due largely to failure to apply soil conservation practices. This results in transport of pesticides on soil particles to streams, development of high suspended solids and turbidity, and high sedimentation rates in lakes and reservoirs." Thus, the environmental challenge to do a more effective and efficient job of soil and water conservation is obvious.

Some reassuring statements are made in the report on pesticides in the environment. "Available data," it says, "show that most crops grown on pesticide-contaminated soils absorb only very small amounts of the soil contaminant. In most cases the residues resulting from soil contamination are far below the tolerances established for human food and, therefore, are below concentrations which would be harmful to humans. . . . Available evidence indicates that residues present in soils in most cases are not harmful either to the crop or to the soil microflora."

The report was assembled by a task force of 26 environmental scientists and engineers. Some 80 additional experts reviewed various sections of the report. No single cure-all for the Nation's complex pollution problems is proposed. Instead, a total of 73 recommendations are made, ranging from stricter regulation of automobile exhaust to research on the long-term effects

of pollutants on people, vegetation, building materials, and the general ecology.

The report will be a useful addition to the library of people and agencies with responsibility for attention to our environment in the years immediately ahead. It is recommended reading for plant scientists, soil scientists, and engineers in soil, water, and related resources work.—D. M. WHITT, *director, Plant Sciences Division, SCS, Washington, D.C.*

Water: Canadian Needs and Resources. BY J. S. CRAM. 1968. *Harvest House, Montreal.* 184 pp., illus. \$5.00; paper \$2.50.

While this book is directed to Canadian water needs and resources, it discusses basic principles and considerations that are of interest to anyone concerned with water problems. About a third of the book is devoted to problems of direct interest to Canadians and those planners in the United States who look to Canada as a possible source of water for inter-basin transfers.—EUGENE C. BUIE, *director, River Basins Division, SCS.*

New publications

Trout Farming. BY PAUL M. SCHEFFER and L. DEAN MARRIAGE. 1969. *USDA Leaflet 552.* 8 pp.; illus. \$0.10. This leaflet is the first publication on trout farming based on the experience of Soil Conservation Service biologists. It presents a map that shows the areas where trout farming is most likely to be successful. The leaflet also describes four kinds of commercial fish culture; describes the need for suitable water, land, and market; and outlines the estimated cost of producing trout and maintaining fish ponds. Questions are listed at the end of the leaflet for the prospective farmer to ask himself to see if the trout farm would be successful.

Why TSI? 1969. *USDA Forest Service, PA-901.* 14 pp., illus. Folder, showing the need for timber stand improvement and making the point that, coupled with other improvement practices, timber stand improvement can help increase profits from forest resources.

Rural Indian Americans in Poverty. BY HELEN W. JOHNSON. 1969. *USDA Agri. Econ. Rept. 167.* 27 pp. "Most Indian Americans are rural residents, and they are poor . . . Alleviation of poverty status, improvement of educational and employment opportunity, and wider participation in the society at large constitute

high-priority needs for all people in distress. Rural Indians are among the most deprived groups in America today. The pages that follow will give some measure of the depth of their disadvantage."

Major Statistical Series of the U.S. Department of Agriculture, How They are Constructed and Used. Vol. 3. Gross and Net Farm Income. BY MARDY MYERS. 1969. *USDA Agr. Hbk.* 365. 17 pp. \$0.30.

The Great Plains Conservation Program. Rev. 1969. *USDA PA* 669. 16 pp., illus. A progress report.

Farm Costs and Returns: Commercial Farms by Type, Size and Location. 1969. *USDA Agr. Inf. Bull.* 230. 23 pp. Data for 1968.

Extension Work in Public Affairs. BY E. J. NIEDERFRANK and DOYLE SPURLOCK. 1969. *USDA PA-932.* 8 pp. \$0.10.

Wildlife Management in the National Parks. BY THE ADVISORY BOARD ON WILDLIFE MANAGEMENT (A. S. Leopold, Ch., S. A. Cain, C. M. Cottam, I. N. Gabrielson, T. L. Kimball). 1963, reprinted 1969. *U.S. Dept. Int.* 14 pp. \$0.15. This reprint from *Administrative Policies for Natural Areas of the National Park Service* makes this important policy statement generally available again.

You're on Camera . . . in Color. BY JOE TONKIN. 1969. *USDA PA-914.* 21 pp., illus. \$0.45. "A television handbook for Extension workers." Equally useful to soil conservationists and others who have occasion to appear on television.

Audio-visuals

Order USDA slide sets from Photography Division, Office of Information, USDA, Washington, D.C. 20250; filmstrips from Photo Lab, Inc., 3825 Georgia Ave. N.W. Washington, D.C. 20011.

Washout. 1969. *USDA. C-160.* 50 frames, with narrative. Slide set \$8.00, filmstrip \$5.50. The slide set is a study of suburban sediment problems and their cures. It tells the story of America's number one water pollutant and how it is drastically increased when farmland near cities is converted to housing, highways, shopping centers, and other suburban uses. It also shows the proved conservation practices that can be employed to halt or greatly reduce this costly erosion damage.

Big Game Management on Public Lands. 1969. *C-159.* 79 frames. Slide set \$12.50, filmstrip \$8.50. An introduction to big game management on public lands. ♦

Air pollution

Even though the Dust Bowl of the thirties is no longer a focal point of national concern, blowing soil is still a significant cause of air pollution. The Public Health Service reports that 30 million tons of natural dust enter the air over the continental United States during an average year. ♦

Meetings . . .

Environmental quality focus of NACD

The role of conservation districts in improving environmental quality will be the focus of the 24th Annual Convention of the National Association of Soil and Water Conservation Districts to be held February 1-5, in San Francisco, Calif.

More than 2,000 district officials and other conservationists are expected to attend the convention's general sessions, committee meetings, and special functions. Among the speakers will be John Harms, editor of the Kiplinger Agricultural Letter. NACD President Sam Studebaker of Tipp City, Ohio, will discuss "Key Conservation Issues for 1970."

Special activities planned include a Soil Stewardship inspiration meeting, a ladies' tour, a Chinatown banquet, and a post-convention tour of conservation achievements in California.

Sprinkler irrigation meeting on water pollution

"Water Pollution, Our Soiled Heritage" will be the central theme of the annual technical conference of the Sprinkler Irrigation Association when it convenes on February 1-3 in Denver, Colo.

"Problems and Approaches to Waste Water Treatment Systems" will head the discussion, followed by "The Pollution Threat is Real" and "Water Waste Disposal Problems."

Land contractors to discuss future needs

The Land Improvement Contractors of America are holding their annual convention in Las Vegas, Nev., February 23-25.

This year's conference will focus on the future, with special emphasis on the need for land contractors to acquire additional skills to construct the larger and more complicated structures required in soil and

water conservation and in the reduction of pollution.

The association has just completed four workshops to show contractors the importance of developing an organization that can help them in acquiring additional capability for the work ahead.

Dates and places

February 1-3, Sprinkler Irrigation Association, Denver, Colo.

1-5, National Association of Soil and Water Conservation Districts, San Francisco, Calif.

9-12, American Society of Range Management, Denver, Colo.

14-18, American Association of School Administrators, Atlantic City, N.J.

23-25, Land Improvement Contractors of America, Las Vegas, Nev.

25-28, American Camping Association, St. Louis, Mo.

March

1-5, American Road Builders' Association, New York, N.Y.

2-6, American Society of Photogrammetry, Washington, D.C.

6-12, Associated General Contractors of America, New Orleans, La.

11-14, National Farmers Union, Denver, Colo.

13-17, National Science Teachers Association, Cincinnati, Ohio.

14-18, Association for Supervision and Curriculum Development, San Francisco, Calif.

15-19, American Concrete Pipe Association Technical Conference, New Orleans, La.

16-18, American Pulpwood Association, New York, N.Y.

20-22, National Wildlife Federation, Chicago, Ill.

20-26, Lawn and Garden Week

21-23, The Wildlife Society, Chicago, Ill.

23-25, North American Wildlife and Natural Resources Conference, Chicago, Ill. ♦

Soil tests related to survey

The Pennsylvania State University Soil Testing Laboratory uses soil survey information when making fertilizer recommendations. Growers identify the predominant soil in the field being tested and supply the series name as well as field history. Recommendations are based on soil analysis and this additional information. Although only 65 percent of the state has been surveyed for soil type, 45 percent of the samples are coming in with that extra identification. ♦

From the Administrator:

Environment and conservation

As we move into the seventies, we see the leadership of the major conservation forces evaluating their programs and setting goals for the decade ahead.

This month supervisors of the Nation's soil and water conservation districts at the annual meeting of the National Association of Conservation Districts focus attention on their role in improving environmental quality in the future.

These broadened concerns are in the best tradition of the American democratic process, for it is axiomatic of our system that its leadership should reflect the concerns of its citizenship.

And there can be no doubt that the American citizenship is becoming deeply concerned about the quality of its environment. To cite only three examples:

- A recent Gallup poll indicated that three out of four Americans are willing to support higher taxes for conservation work.
- College students across the Nation are planning a campus "teach-in" on environmental problems this spring.
- Since 1963, the various states have more than doubled the total nonfederal funds appropriated, nationwide, for soil conservation district use.

This increased interest by so many groups in what is happening to our natural resources calls for the highest order of planning and performance on the part of conservation bodies, official and private.

All the needs and problems and desires must be balanced and accommodated in a course of action that will meet the growing demands on a nonexpanding land and water-resource base. While providing for essential production needs, good resource planning must consider also the needs for beauty, open space, and outdoor recreation.

Many interests must be blended and many people must be involved. As we go into the seventies, district leaders and professional conservationists need to encourage more urban participation, especially where most

citizens already live in cities, towns, or suburbs.

Urban people have the right—and the duty—to be active in resource planning. This is not so much a new direction for conservation districts as it is an accelerating one.

We all know that conservation problems don't stop at the boundary lines of a city any more than soil stops blowing or water stops flowing as it moves from rural to urban areas, or vice versa. Businessmen, housewives, doctors, are concerned with land use decisions that affect them and their children.

These people know something about floods; they worry about pollution; and they recognize the despoiled landscape that results from soil erosion in too many urbanizing areas.

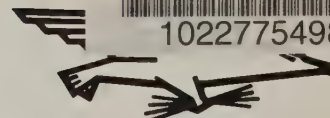
The Soil Conservation Service for years has worked with conservation districts and with men and women in other conservation groups to improve the environment, especially in rural areas.

We have a major role to play in this matter in the future, in both rural and urban areas. As a government agency, we must, of course confine our activities to the specific purposes for which we are authorized to spend public funds. But in carrying out our assigned tasks, we have an obligation to see that they contribute the maximum to our common goal of an improved environment for human living.

Kenneth E. Grant



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Flood-prevention lake yields first spring fishing



A new fishing lake in Maine's north country was an immediate product of the first completed flood-protection structure in the Presque Isle Stream Watershed Project in Aroostook County.

Wildlife protection and enhancement plus new recreation opportunities were goals of sponsors of the project planning flood protection for the heart of one of America's major potato farming areas.

In the spring of 1969 as the ice receded from the shoreline, news spread rapidly that fishing was excellent at the 118-acre multipurpose lake at Hanson Brook (shown above). Two to three hundred peo-

ple per day enjoyed the area's first spring fishing. Public use remained high until more remote lakes became accessible and continued steadily throughout the summer.

Sponsors of the project—the city of Presque Isle, towns of Chapman and Mapleton, and the Central Aroostook Soil and Water Conservation District—were assured in the planning stage by Maine's Department of Inland Fisheries and Game that wildlife management assistance would be available.

In addition to flood-control practices, several hundred acres of new wildlife marsh developments and a

fish ladder on the main Presque Isle Stream were planned. Land-treatment measures to reduce pollution of fish-spawning areas and streamflow stabilization also are part of the project.

To prepare for a quality fishery at Hanson Lake, the Fisheries and Game Department treated a 3.3-square-mile drainage area with rotenone to eliminate trash fish immediately after the dam was closed. The lake was stocked with brook trout and the sponsors enforced a five-fish limit on the take and prohibited the use of live bait.—JOHN C. MALLEY, *district conservationist, SCS, Presque Isle, Maine.* ♦

March 1970 35/8

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Soil **Conservation**

Devoted to the wise use of land and water resources



Conservation district cooperators in many places are taking positive action to provide sanctuaries and create new or improved habitats for wildlife—often at considerable expense with no promise of financial return.

It's convincing proof that intangible values often outweigh the economic with people who make the decisions that count.

Sanctuary

Note, for example, the voluntary dedication of a part of the Camp Ranch in Texas to preserving the unique nesting habitat of the rare golden-cheeked warbler (p. 171).

In a different setting but with similar motives, a Kentucky landowner established a private wildlife sanctuary and nature education center (p. 173).

Something added

The sensitive account by a district cooperator (p. 179) of how she and her family watched the growth of a new wildlife community around their farm pond relegates economic gain to a low position on their scale of values.

In each of these examples, chosen from the many reported, SCS biologists and conservationists helped with planning as a service to the conservation district.

Recon

"Reconnaissance: An exploratory inspection."—Webster's 3d ed.

Alert technical specialists and conservationists with pertinent intelligence to contribute to our new department (p. 190) should send it to the editor.

COVER: Whitetailed deer in a Michigan forest. Many conservation district cooperators make positive improvements in wildlife habitat, in addition to normal soil and water conservation practices.



Soil Conservation

Devoted to the wise use of land and water resources

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A private sanctuary for a rare warbler

By Lynn J. Post and Vernon M. Hicks
Biologists, SCS, Bandera and Temple, Tex.

Concern for a rare bird smaller than a sparrow turned the bulldozers aside in brush-clearing operations for range improvement on the 8,000-acre Camp Ranch in Texas.

The Camp brothers—John, Jr., Rodney, and Bill—knew that the dense oak-juniper woodland on their ranch was some of the little remaining nesting habitat of the golden-cheeked warbler. When they made a conservation plan as cooper-

ators with the Bandera Soil and Water Conservation District in 1962, they worked out a clearing pattern that would preserve critical areas of mature juniper (cedar) for the birds while making room for grass on the more productive soils.

The golden-cheeked warbler is a bird of very local occurrence, nesting only in the "Hill Country" (Edwards Plateau area) of Texas and wintering in Mexico and Cen-

tral America. It requires a specific type of habitat for nesting—oak-juniper woodland where mature or virgin juniper is dominant.

The mature juniper stands are becoming scarce as landowners seek out the last of them as a source of top-quality posts, and ranchers clear the land to improve the range. Second growth juniper is plentiful in the Hill Country and the plant has invaded much formerly open grass-

A Texas ranch cooperating with a conservation district is preserving areas of virgin juniper (above) required as nesting habitat by the rare golden-cheeked warbler. Strips and patches of brush remain after clearing for range improvement.



land, but the golden-cheeked warbler does not use these young stands as nesting sites.

The Camp Ranch is a working ranch that raises livestock and wildlife. When the conservation plan was developed, the entire ranch was covered with dense brush, which severely limited forage production. As a result, little profit could be realized from either livestock or wildlife, and it was difficult to observe and

enjoy deer and other wildlife. Following a well thought-out brush control program and sound grazing management, the owners have made improvements in both livestock production and wildlife abundance.

All brush control has been done with definite consideration for wildlife. Since deer use the steeper slopes for food and rest areas, the rule has been to leave the rocky and steep areas in brush and clear the

more productive sites. Selected areas of the mature juniper and oak were retained for the golden-cheeked warbler.

Many choice wildlife foods now grow in areas that had been choked out by the brush. As a result, the ranch now produces more livestock forage, supports a large healthy deer and turkey population, and the rare golden-cheeked warbler has prime nesting cover available. ♦

At right, SCS District Conservationist Frank Sprague and Rancher John Camp, Jr., check the conservation plan map showing the area of prime nesting habitat in front of them to be preserved. Below, an aerial view of the Camp Ranch shows the pattern of brush clearing leaving a large area of mature oak-juniper woodland in the bend of the Medina River for the golden-cheeked warbler.



That wildlife in the human environment is a necessity rather than a luxury is one of the ideas a person takes away from a visit to the Clyde E. Buckley Wildlife Sanctuary near Versailles, Ky. Overlooking the valley of the Kentucky River, this 285-acre conservation education and nature study center is readily accessible to more than a quarter of a million people.

Operated by the Buckley Hills

**By William H. Casey and
Stewart M. Calvert**

*Biologist and district conservationist,
SCS, Lexington and Versailles, Ky.*

Audubon Society in cooperation with the National Audubon Society, the sanctuary was developed in cooperation with the Woodford County Soil and Water Conservation District with technical assistance from the Soil Conservation Service and other agencies and individuals.

The sanctuary offers both the scientific community and the general public an opportunity to learn about the interrelationships of living things, including man himself, and about how dependent man is upon other forms of life for his own well-being.

The ecological cycle

Here people can study, or have interpreted for them, the organization of life in ponds and streams; the natural history of birds, mammals, insects, reptiles, fishes, and many other forms of animal life; the soil-plant-animal-man relationship; and the processes of decay, by which tiny animals, such as arthropods and annelids, break down organic matter so bacteria can further reduce it to the molecules that again become the building blocks of the food man eats, the water he drinks, and the air he breathes. Here people come to

realize, sometimes for the first time, how vital it is to human life that this recycling of matter be carried on without interruption.

The sanctuary was created by the beneficence of Mrs. Clyde E. Buckley, widow of a prominent Lexington businessman. Mr. Buckley acquired the original tract in 1954 as a general farm of a type then common to Woodford County. The principal crops were tobacco and

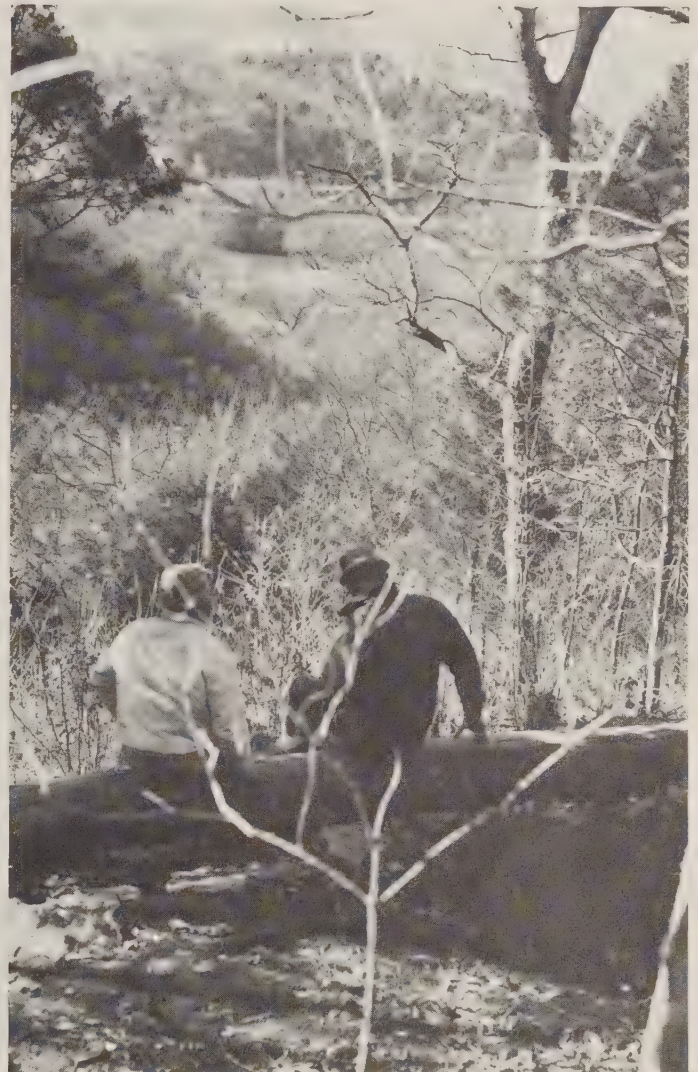
hay, and a considerable acreage was used for pasture. The steeper portions supported stands of oak-hickory woodland.

Beginning of a sanctuary

After 1954, however, farming was not practiced as intensively as before, and many of the fields grew up in brush and trees. By the time Mr. Buckley died, in 1966, there existed an intermixture of various

A place to learn the value of wildlife

The Clyde E. Buckley Wildlife Sanctuary



kinds of vegetation, a condition that normally attracts and holds a great variety and abundance of wildlife.

After her husband's death, Mrs. Buckley decided to explore the possibility of making the area a wildlife sanctuary. She solicited the advice of Ray Harm, Kentucky's noted wildlife artist, who visited the area and encouraged her to make it a sanctuary.

He suggested that the interest of the National Audubon Society be investigated, and he himself was instrumental in getting that organization to assume direction of the development of the area until a local affiliate could be formed. Thus the Clyde E. Buckley Wildlife Sanctuary was born.

As director-naturalist to supervise the use of the area and to carry out development and management measures, Mrs. Buckley secured the services of Ellwood J. Carr, a one-time California farmer and more recently a naturalist with the Kentucky Department of Parks at Pine Mountain State Park.

Needed: inventory and plan

Carr frankly admits that when he assumed his duties as director he hardly knew which of the many tasks before him he ought to undertake first. What he needed most, he saw, was an inventory of the sanctuary's physical resources and an orderly plan for their development and use.

Recalling that while farming in California he had obtained technical assistance in developing a conservation plan from the Sacramento County Soil and Water Conservation District, he decided to ask for

similar assistance from the local Woodford County Soil and Water Conservation District.

Subsequently, with the assistance of the Soil Conservation Service biologist, a conservation plan was developed for the sanctuary as a cooperator with the district. The plan provides for the establishment of a conservation-cropping system for the 15 acres of land that is to remain in cultivation, the construction of a 1-acre wildlife pond and the renovation of a smaller one, preservation of an old field habitat by periodic strip-mowing, the construction of nature interpretation trails, and the establishment of plant succession study plots.

By the fall of 1969, the new wildlife pond was completed, the smaller pond enlarged, 30 acres of old field habitat mowed, 6 miles of nature trails built, and 2 acres of plant succession plots established. The conservation-cropping system will be installed in the spring of 1970.

In addition to helping with the plan, the district has provided information on the design of parking lots and observation platforms, and on the selection of shrubs and trees that are both suitable for landscaping and attractive to birds. Director Carr was also given advice on such diverse subjects as how to clean animal skeletons with dermestid beetles, how to census the bird pop-

ulation of the area, how to estimate the amount of grain a seed-eating bird of a given size will eat in a day, and how to inventory the sanctuary's vegetation.

Ray Harm House

Much progress has been made in improving the buildings and grounds during the past year. The old farm dwelling, which is now used as an interpretative center, has been renovated inside and out and has been appropriately named "Ray Harm House."

The interior has been redecorated, and display cases containing fossils, animal skulls, and bird nests have been installed. Mounted plants, collected on the area, are displayed on the walls. One room contains, in addition to the other displays, a complete collection of Ray Harm prints. Another room has been converted into a small auditorium where the director-naturalist conducts regularly scheduled interpretive programs. The grounds around it have been landscaped and a number of trees attractive to wildlife have been planted.

Not far from the interpretive center and overlooking the enlarged wildlife pond is a frame bird-watching shelter, given to the sanctuary by Mrs. Marion Lindsay, Mrs. Buckley's sister. Here visitors can watch birds come in to the many



SCS District Conservationist Stewart Calvert (left) and Director-Naturalist Ellwood Carr discuss the successful modification of a livestock pond to make it more attractive to wildlife.

feeders that have been erected, and, if they are very quiet and very lucky, they may see a whitetailed deer come to the pond for water.

Visitors to the sanctuary were comparatively few until October 1968 when the director issued the sanctuary's first newsletter. The number of visitors promptly increased from about 50 a month to about 200 and has increased steadily until in October 1969 it was more than 750.

Variety of users

People come as individuals, in family groups, and as groups. Carr estimates that about half of them are in organized groups, such as garden clubs, the Girl Scouts, and college classes studying botany, ecology, or ornithology. Transylvania University in Lexington and Asbury College in nearby Wilmore, especially, are frequent users of the area.

High school science teachers in summer classes at the University of Kentucky, the University of Louisville, and Asbury College have visited the sanctuary to study nature education as a form of outdoor recreation. Other individuals from as far away as Florida have visited the area to gather ideas and information for use in developing similar areas in their communities.

The future of the Clyde E. Buckley Wildlife Sanctuary appears bright. Mrs. Buckley has added to the original tract until the area is now about 285 acres. Financial support comes from an endowment fund established by Mrs. Buckley, income from the sale of crops grown on the area, and dues collected from members of the Buckley Hills Audubon Society.

Interest in the sanctuary has increased Audubon Society membership in Kentucky from about 250 to more than 4,000 in 2 years.

Plans for further development of the sanctuary call for expanding the interpretive program and improving facilities as time, money, and labor permit. ♦

Nature trails are for everyone

By Robert J. Lemaire

Conservation biologist, SCS, Lincoln, Nebr.

For some people, the out-of-doors is only a place to shoot, catch, collect, or cut down. But for those whose "bag" is not bagging some living thing, nature trails provide an excellent route for relaxation and appreciation.

Good layout and management are key factors in the creation and maintenance of a trail that will please serious students of nature as well as casual observers just out for a stroll. Well-planned trails not only interest those who have studied biology and ecology but also teach something about environment to many who know little about their natural surroundings.

A single-purpose trail might focus a wanderer's attention on geological or botanical sights, marsh life, or animal shelters. In most instances, a multipurpose trail suits more tastes and lends itself to freer interpretation and use. Nature photographers, artists, bird watchers, and other non-consumptive enjoyers and recorders may respond to the same trail in many different ways.

Choose routes of varying length and content after walking through the proposed trail area and noting natural phenomena to be included in the final scheme. Inventory should be taken every 3 to 4 weeks during the growing season so plants blooming at different times will be labeled properly or accounted for in any handout prepared for visitors.

It is sometimes desirable to transplant interesting species if they grow in the vicinity but are not on routes selected. As for poisonous plants, either remove them or keep and label those that are out of reach so that all may learn to recognize them.

A winding one-way trail affords a sense of seclusion. A loop or figure eight with entrance and exit in about the same location is preferred. Use

brightly colored plastic marker flags to indicate paths and points of interest until final labels are made. Plan to call attention to evidence of insect damage, rotten logs, mosses, fungi, and typical wildlife as well as plants and trees.

Experience shows that a comfortable length for a nature trail is about one-half mile or approximately 45 minutes walking time. Visitors may appreciate an occasional marker that tells where to turn at intersections or how far it is to the end. Rest areas with logs, grassy spots, rustic benches, or flat rocks will help forestall fatigue and flagging interest along the way.

Where possible, the trail should lead visitors along rocky ridges and streams and through a variety of habitats, such as woodland, prairie, swamp, and marsh. Selective tree cutting sometimes opens a beautiful vista or overlook that further enriches a trail.

Its surface should be reasonably smooth without being artificial. Sometimes initial mowing is all that is needed. Otherwise, wood chips or sawdust are suitable. Steep slopes should be avoided because they tire visitors and increase erosion and maintenance problems.

In addition to giving the trail itself an appealing name, make sure that examples of conspicuous flora and fauna are clearly marked. Plastic signs and others mounted on weatherproof wood, composition material, or metal should be legible, attractive, and permanent.

Although preference and budget will dictate the labeling scheme, one may put names or numbers on each sign. A descriptive booklet containing further explanation can be keyed to the trail's content. Some trails have been marked in Braille for the benefit of the blind. ♦

Blasting potholes in drained wet land restores nesting areas

By Robert W. Franzen

Wildlife biologist, SCS, Auburn, N.Y.

In 1954, highway construction in Cayuga County, N.Y., drained 30 acres of good waterfowl habitat. Milton D. Casey owned a portion of the marsh, once a summer home for mallards. During hunting season, he could bag his limit of ducks in a morning. Today, Casey and the Cayuga County Soil and Water Conservation District have successfully reestablished waterfowl habitat by blasting potholes.

During highway reconstruction, crews lowered the culvert pipe in the new roadbed, causing surface drainage. The ground-water table in this organic muck soil, however, remained near the surface to support aquatic plants, but there was no standing water to attract waterfowl.

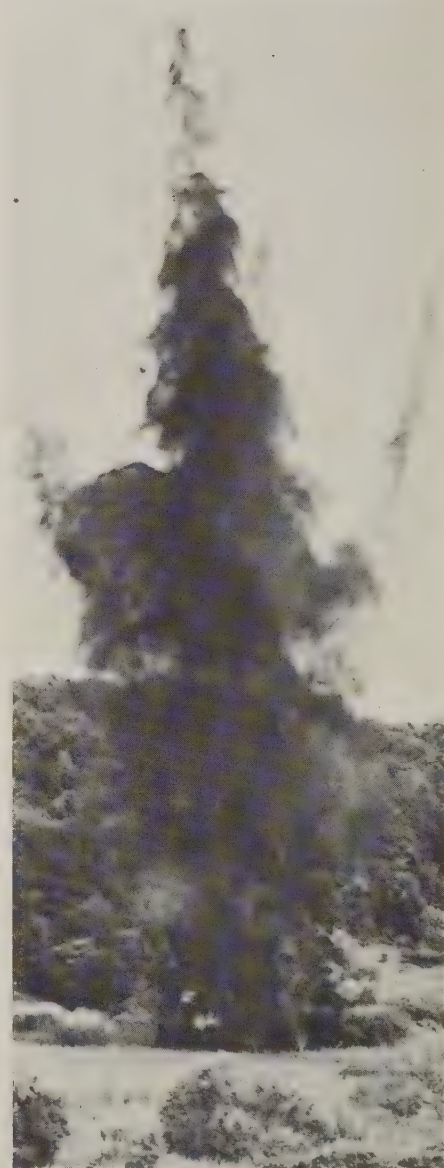
For esthetic and sporting reasons, Casey wondered if water could be impounded by an earthen dam to develop part of the area into a waterfowl marsh. The conservation district office in Auburn investigated the site and found that an earth embankment was not feasible because the muck soil was extremely deep, porous, and unstable.

As an alternative to impounding water, potholes were recommended. Casey had read about creating potholes with explosives and decided

to try the method. A licensed contractor undertook the blasting job. Dynamite could be used, but ammonium nitrate was cheaper. After preliminary tests on Casey's 5 acres of wet land, he blasted 21 potholes measuring 25 to 30 feet in diameter and 8 feet deep—each was the result of placing three 25-pound ammonium charges 6 to 8 feet apart in a triangular pattern.

The cost of blasting materials averaged \$4.50 per pothole. The contractor and his two helpers needed 35 minutes to set and detonate the charges on an average pothole site. The total cost to produce each pothole was approximately \$20. By installing four potholes per acre and allowing approximately 100 feet between centers, Casey provided some 2,000 square feet of water surface per acre.

After blasting the potholes, there remained two more items recommended by SCS biologists to be installed. First, an 8- to 10-foot long "loafing log" was anchored into the bank extending toward the center of each pothole. These logs provide good resting sites and places for ducks to defend their territories. They are important areas for courtship, breeding, and brood raising.



A pothole is blasted with 75 pounds of ammonium nitrate-fuel mixture.

No surface water was available to waterfowl before pothole development.

A garden is a whole city park

How big is a garden? To the Alexandria Garden Club its as big as the 94-acre city park in the middle of Alexandria, La.

This park is where the 170-member club put a conservation project to work which helped them win the coveted Lucile Droege Mauntel Conservation Award given each year by the National Council of State Garden Clubs. The Alexandria club competed with 14,377 other clubs representing 387,700 members.

Mrs. M. L. Laird, Jr., 1968-69 club president, tells how the unique multiple-use project got underway. "The whole thing started when members of our club were invited to go to an adjoining parish to see some conservation work being done on part of a city park. The idea was so good, we decided to develop a similar project in our own city park.

"We decided to use about 15 acres for a nature study area that all the schools in the parish could use. We called on the Soil Conservation Service, Louisiana Forestry Commission, Louisiana Wild Life and Fisheries Commission, and representatives from several mineral industries."

The city of Alexandria did most of the work to build structures and signs. The Education Center and the Parish School Board supplied financial help to buy materials. The Forestry commission tagged more than 75 different trees and shrubs for students to identify. The Soil Conservation Service collected 10 monoliths of soils in the parish, prepared a soil map, furnished color pictures of different land uses.

The project was finished in April 1969. A workshop was held for parish teachers to familiarize them with the nature area. More than 100 teachers and school officials turned out.—ALEXANDER KERR, JR., *soil scientist, SCS, Alexandria, La.* ♦



Blasted holes quickly filled with water, creating ponds 25 feet in diameter and about 8 feet deep. A wood duck nesting box and loafing log were then added.

Second, wood duck nesting boxes, installed on nearby posts or trees, compensated for the lack of hollow trees.

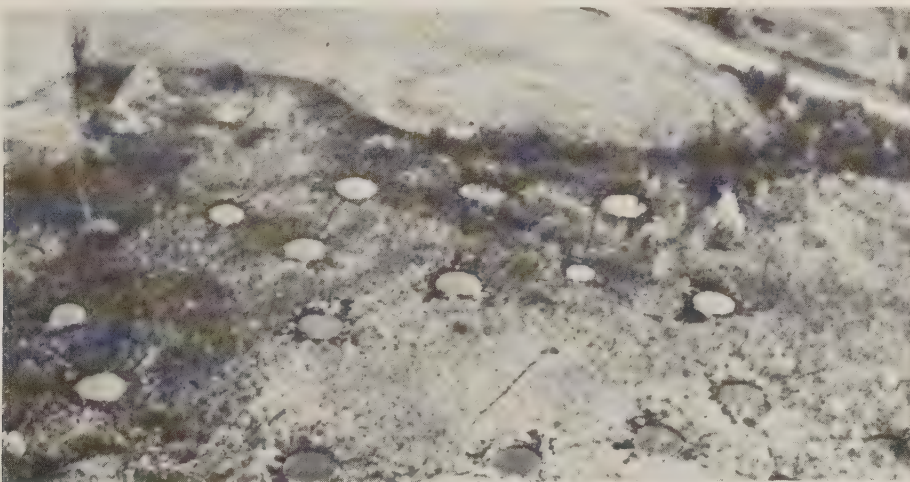
Several species of waterfowl food plants became established naturally in the potholes shortly after blasting, so planting was unnecessary. Teal arrived on the potholes shortly afterward, indicating that the artificial marshes should carry increased numbers of wildfowl during the fall and spring migration and next summer's nesting.

Each new pothole is a potential home for a brood of each duck species common to the area. On that basis, we might expect black ducks

and mallards to raise 210 ducklings a year on Casey's 21 potholes. Experience indicates, however, that only 15 percent of New York's ponds produce a brood of ducks each year. Even at that rate, Casey's project could produce 30 ducklings a year.

Interest in creating waterfowl habitat by blasting potholes has spread rapidly in the Cayuga and adjacent Oswego County soil and water conservation districts. Pothole blasting is an applicable alternative for waterfowl habitat development on level, high water table soils throughout New York and particularly in the Lake Plains area. ♦

Aerial view of Casey's potholes shows approximately 10,000 square feet of open water in 5 acres.



Showcase for country living

A 76-acre Conservation Showcase in northeastern Connecticut is helping to orient former urban residents to country living.

The Windham County Soil and Water Conservation District established the showcase to give newcomers a firsthand view of the alternatives in land uses and conservation practices available to improve their lands. It serves as an outdoor catalog where observers can study the performance of plants before using them on their properties.

The Soil Conservation Service assisted the district in establishing suitable plants for the demonstration area. SCS tests performance of plants at its Big Flats, N.Y., and Cape May Court House, N.J., plant materials centers before they are recommended to the district. The Windham showcase includes nearly 75 introduced species of plant materials being evaluated under a cooperative agreement between SCS and the district. Emphasis is on multi-purpose plants that have values for wildlife, erosion control, and beautification, especially those useful in a situation of changing land use.

One of the most versatile plants on the showcase grounds is the perennial flatpea, *Lathyrus sylvestris*. Its dense mat of leaves and stems produces excellent surface protection against erosion. It is similar in appearance and growth habit to the ornamental sweetpea, although flowers are less numerous and showy. The plants reach a height of 2 to 3 feet during the growing season, then settle to less than a foot during the winter.

At the Windham Showcase, an area cleared for a woods road was seeded in the fall of 1963 to a mixture of perennial flatpea and Kentucky 31 tall fescue. The pea

became the dominant species and has successfully competed with quackgrass and woody plants.

Perennial flatpea when used as cover for woods roads, access roads, firebreaks, nature trails, hiking and bridle paths, and powerline rights-of-way, requires little maintenance and provides food and cover for wildlife. Use of this plant for sediment control in urban areas seems feasible.

Showcase visitors also see examples of excellent ground covers of reed canarygrass, smooth brome, birdsfoot trefoil, and crownvetch. They observe wildlife feeding on Cardinal autumn olive, a special strain introduced by the U.S. Department of Agriculture. Amur honeysuckle also provides winter food for pheasants, rabbits, other game, and songbirds.

Through its showcase, the Windham County Soil and Water Conservation District is able to demonstrate many ways to practice conservation on private land.—ALBION L. WEEKS AND ELMER E. OFFERMAN, *district conservationist and resource planning specialist, SCS, Brooklyn and Storrs, Conn.* ♦

Coast farm is haven for birds

“Protect ospreys” is not just a slogan for Mrs. Gilbert Fernandez. It is a continuing crusade and typical of her concern for wildlife in the Bristol Conservation District in Massachusetts.

Her zeal in carrying her beliefs to fellow members of bird, garden, and camera clubs, and to business men's groups and conservation organizations has helped to promote interest in wildlife and planting programs.

The 100-acre Stone Barn Farm where Josephine and Gilbert Fernandez live in South Dartmouth, not far from the foaming surf at Horse-neck Beach is in itself a demonstration of Mrs. Fernandez' conservation enthusiasm.

On the farm, 2 to 3 acres of food strips consisting of sudax, wheat, corn, and rye attract pheasant, quail, geese, and ducks. Smaller birds enjoy the massive hedgerows of rugosa rose, the quarter-acre cultivated blueberry patch, the acres of juniper, field edges of wild cherry, honeysuckle hiding the stone walls, patches of tatarian honeysuckle and elderberry, the plantings of autumn olive, the cover of bayberry and wild blueberry on the moors, the lines of planted holly, and the sour cherry and black mulberry trees.

Chickadees, cardinals, purple finches, and juncos are among the patronizers of feeding stations about the lawn and flower garden. The farm supports families of great horned owls, raccoons, red foxes, woodchucks, and many cottontails. Other birds are towhees, thrushes, warblers, sparrows, robins, scarlet tanagers, and mockingbirds.

“But the osprey, or fish-hawk, is now one of the world's seriously endangered wildlife species, and we are trying to enlist the support of others to save it,” Mrs. Fernandez said.

“These placid birds tend to return year after year to specific locations,” continued Mrs. Fernandez. “Our first step was to protect these historic sites and obtain the support of all the landowners concerned and their promise of site preservation.”

Seasonal surveys include frequent nest-checks for egg production and losses, chick hatching, and fledging. Broken and unhatched eggs are gathered for analysis.

Ten nests fell down in 1968-69 but the Fernandez' set out nine nest platforms atop sturdy poles of red-cedar. These 40 by 40-inch squares, from 12 to 20 feet high, supported manmade nests of materials, interwoven and balanced to a depth of 8 inches.

Visitors to Stone Barn Farm, Mrs. Fernandez believes, are another method of spreading the word that there's a role for everyone in improving the outdoor environment.—AUGUST I. REESE, *district conservationist, SCS, Middleboro, Mass.* ♦

Katy and Bruce Andrews became cooperators with the Oconto County Soil and Water Conservation District in 1960. In 1964, I helped them complete a conservation plan for their 160-acre tree farm surrounded by the Nicolet National Forest in the cutover country of northern Wisconsin.

Their land had once been a small dairy farm, which had proved uneconomic to the previous owner because of the sandy soil, short growing season, and the long haul to markets. The Andrews decided that trees and recreation would be the

principal crops in the future.

Katy and Bruce had always been great lovers of the outdoors, and their children had grown up as year-round campers and canoeing enthusiasts. The farm was to be their answer to crowded and littered campgrounds, their escape from the high powered motor boats that endangered their swimming and canoeing.

They built their pond to satisfy their desire for outdoor recreation and to attract wildlife. They also left a 20-acre field open—a planned

"island" in the vast forest area. This they seeded to red-clover and planted strips of corn and sunflowers for wildlife food.

A detailed inventory of their forest land was made with a forester from the Wisconsin Department of Natural Resources, and the Andrews joined in the "Trees for Tomorrow" program.

The pond about which Katy Andrews writes is only one of many conservation measures undertaken by an outdoor-minded and talented family.—GLENN GARVEY, district conservationist, SCS, Oconto, Wis.



Birth of a pond

By Mrs. Katherine Andrews

A conservation district cooperator, Appleton, Wis.

It is a soft spring evening, and down here by the pond the peepers and bullfrogs are in full chorus.

Later on, in the summer twilight, the hermit thrush will fill the air with his high sweet bugling. The surface of the water is still warm from the afternoon sun, and the bass are leaping for a fresh hatch of insects.

As daylight fades and night descends, the swallows swoop low. The dusky afterglow accents the colors of pails and shovels—red, blue, and yellow—abandoned on a patch of sand at the water's edge. The shouts of the children who played with them seem still to be echoing through the surrounding forest, even though the youngsters themselves have returned to the city,

exhausted after a day of splashing in the shallows, catching frogs, and rowing the flat-bottomed boat.

When the moon rises and the starshine is reflected in the water, dark shapes will steal quietly down to drink. There will be deer and raccoon; possibly a she-bear with her cubs; perhaps a swimming muskrat breaking the surface of the pond into silver ripples.

In the winter, when the snow is not too deep and heavy to shovel a path on the pond, there is skating. Tobogganning the slopes is fast and exciting. Adding to the enjoyment is a crackling fire at which to broil wieners, heat chili, toast marshmallows, and warm one's feet and hands.

It's difficult now to remember that less than 5 years ago the site of our pond was a dry glaciated kettle hole, one of many in the north country.

Originally, there was no sign of water at the bottom of the kettle hole, nor could it even be classified as swampland. But a level area of about three quarters of an acre of mixed brush, marsh-type grass, and wild iris gave us a clue as to what might lie beneath the surface.

If there was water, as we suspected, how far down was it? And was it only runoff from the high tableland adjacent to the kettle hole or were there springs or "slow seeps" that would yield a steady supply to keep a pond filled?

We called in the district conserva-

tionist of the Soil Conservation Service. He told us to make borings from time to time, going down as deep as we could with an auger, to test for water. We were to keep an accurate check of fluctuations in levels—if water were indeed present in any appreciable quantity—and record our findings.

He also explained that this likely would be a water-table pond. Its chief benefit, in this setting, would be to attract wildlife, for deer, raccoon, bear, and other animals—especially deer and bear—come more readily to a water hole in the woods than to the more open spaces around rivers and lakes. Fringe benefits would include picnicking, limited swimming, and, if we “planted” fish, some angling.

It was a suspenseful time as we drilled into the earth at the bottom of the gully. Repeatedly, from the soaking wet weather of early spring through the hot dry spells of late summer and fall, the auger, after going down only a few feet, always came up coated with wet sand and clay. Finally, after 2 years of such testing, we were ready to call in the contractor to begin digging. Plans were drawn up and technical supervision provided by the Soil Conservation Service.

But when our pond project got underway, the suspense of the last 2 years was pale by comparison.

First came the bulldozer, carving a swath 12 feet wide down the hill and through the woods to our pond site. Then, because the ground was soft and spongy, “mats” were hauled in. Made of logs fastened together with cables, they provided a movable platform over which the crane could travel and on which it could rest should the water begin to fill the excavation. A bucket was attached with cables to the boom of the crane. This arrangement is called a “dragline.”

After what seemed an interminable round of preparations and postponements, the day of the actual digging arrived. For the contractor and his crew, this was just another

pond-building job; for us it was a dramatic hour, and several members of our family were on hand to watch. Since we were out in the middle of the woods, we could not have been likened to “sidewalk superintendents,” but rather felt the emotions of a christening party when a ship is launched.

Before the excavating began, it was problematical how far down the dragline would have to dig before water would begin to flow. It was, therefore, cause for elation when water gushed into the hole after the dragline had dug to a depth of less than 4 feet.

In a matter of only a half day's



First the bulldozer, then the dragline, ripped away trees and earth. Then the excavation filled with water; we planted the fish from the game department; and soon peace settled on our pond and a new structure of life came into being. A pond was born. (Photos by the author.)



digging, the water from dozens of small spring pockets was pouring in so fast that a pump had to be put to work to keep the area dry and the dragline—mats and all—from floundering.

Again and again the bucket was dropped into the widening excavation, and a dripping scoopful of wet

sand and clay deposited at the edges of the pond site.

Our pond building began in mid-summer. Because of work stoppages due to weather and the contractor's schedule, however, it was late September before the excavation had been completed, the excess dirt hauled away, and the mounds of raw earth graded and smoothed, ready for planting ground cover.

We sowed rye and brome grass, red fescue and clover to minimize erosion. Because the growth was somewhat slow, the spring runoff and heavy rains for several seasons caused washouts. Each time, however, we shoveled the sand and clay back and reseeded. Now we are gradually overcoming this difficulty.

One problem was the cloudiness of the water during most of the first summer. This we corrected by applying alum and lime—a harmless concoction—which acted as a flocculant by drawing the fine particles of clay into masses heavy enough to sink to the bottom.

The vision we had of crocuses, daffodils, and day lilies covering the

slopes faded when some of the bulbs we planted failed to weather the first winter or were eaten by deer. Now we are planning to create colonies of wildflowers that are natural to the site. In time, of course, many of these will spread from the nearby ridges, but we hope by cultivation to speed the process.

One of the fascinating aspects of our pond venture was the rapidity with which wildlife moved in to use this manmade habitat. Deer didn't wait until the noise and turbulence of working machinery had stopped, but found the place to their liking as soon as the bulldozer opened up a trail. And the pond area was scarcely finished and filled with water when a sandpiper skittered along the newly formed beach. Soon after that came bear, raccoon, and muskrat. Their tracks could be seen, along with those of the deer, leading to the pond and around the water's edge.

It was too late in the season for other forms of pond life, but by the next spring we had small salamanders, frogs, and, finally, the aquatic and semiaquatic plants and animals that nature has equipped especially for pond dwelling. Among the latter are the whirligig beetle, which grabs a bubble of air and darts beneath the water at your approach; the water-boatman; the backswimmer; the water strider; and more than a score of others.

Developing along with the larger, more visible species of pond life, are the countless microorganisms, each depending in some way on the other and together forming a complete community—a world within a world, or, as the scientists say, "an ecological structure" or an "ecosystem."

It is always heartening to watch this system come back to life in the spring, after collapsing in the cold death of winter. With the return of songbirds, leaves, and wildflowers, it proclaims renewal and gives those who make the venture of faith another of Nature's assurances of resurrection. ♦



Town solves water shortage

By Henry J. Thiel

SCS district conservationist, Graham, N.C.

Lake Burlington, at Burlington, N. C., is a combination of private, municipal, state, and federal cooperation. All were needed to construct the lake, and all are vital to keeping it.

The city council built Lake Burlington in the late 1950's after a serious drought taught them a bitter lesson on sediment control. Burlington formerly depended on a 137-acre reservoir built in 1927. At the old lake site, the city council owned no land above the waterline, possessed no access to the land adjoining the lake, and employed no conservation measures to control sediment.

SCS personnel made a sediment survey of the old reservoir in 1953 to determine the storage loss due to silt. They reported the silting rate to be 13.5 acre-feet annually, or 0.9 percent of capacity—an annual loss of about \$7,776 of the original investment. When the drought hit in 1953, the water level dropped 16 feet. Too late, the city was helpless to save the reservoir. As an emergency measure, pumps at Haw River

diverted water 3 miles overland into Buttermilk Creek, where it flowed into the old city lake, thereby saving Burlington.

In 1955, the city council set out to build a new reservoir on Stony Creek. Land was purchased, construction contracts were let, and work got underway on the \$1.4 million Lake Burlington—designed to be seven times larger than the old lake. Besides the lake site, the city council also purchased 1,300 adjoining acres and took steps to make Lake Burlington a model of land management and sediment control.

The critical area adjoining the lake was protected by clearing and seeding the shoreline, planting trees, maintaining good ground cover, and resloping eroded areas. The State Highway Department built 3 miles of paved road to Lake Burlington, adding proper ditches, culverts, and roadside stabilization measures to carry runoff and insure that the lake will remain as silt-free as possible.

Private landowners within the watershed—mostly cooperators with the Alamance Soil and Water Con-

servation District—and the city signed a 20-year agreement for the construction and maintenance of 20 small siltation ponds to keep sediment out of the lake, provide stock and irrigation water, furnish fishing and recreation, assist in flood control, serve as water reserves, and enhance the area's beauty.

Lake Burlington was completed in July 1960 and filled the following January, while the watershed commission encouraged local participation in erosion control and conservation practices. Commission members believe that conservation on Lake Burlington has paid off in at least four ways:

- (1) Improved cooperation with adjoining landowners.
- (2) Excellent cooperation among the landowners, highway department, SCS, the conservation district, and the city council.
- (3) Reduced sediment in the reservoir.
- (4) An emergency water reserve of 75 million gallons. ♦

12 new RC&D projects approved for planning help

Twelve new Resource Conservation and Development projects, covering more than 50 million acres or parts of 55 counties in the United States, are now eligible for planning assistance from the Department of Agriculture.

Addition of the 12 projects will make a total of 68 RC&D projects now underway across the Nation.

The projects include: Little Colorado River Plateau Area, Arizona; Chestatee-Chattahoochee Area, Georgia; Tri-Isle, Hawaii; Southern Iowa; Twin Valley Area, Louisiana; Threshold to Maine Area, Maine; Beartooth Area, Montana; Nebraska Panhandle; Lewis & Clark 1805, North Dakota; Ouachita Mountain Area, Oklahoma; Columbia-Blue Mountain, Oregon and Leon-Bosque Area, Texas. ♦

Burlington, N. C., found municipal water depends on cooperation.





Residents of Glenwood Park Methodist Home for the aged share this view of Brush Creek.

Brush Creek recreation exceeds 5-year projection

William J. Melven and Robert A. Speich

Field biologist and RC&D project coordinator, SCS, Morgantown and Princeton, W. Va.

Central Appalachia's Brush Creek watershed—chosen as 1969 Watershed of the Year by the National Watershed Congress—brings flood protection, water supply, health facilities, new industry, and recreation to the Princeton, W. Va., area.

In recreation alone, Brush Creek is 5 years ahead of the planners' expectations. Enthusiastic mountain residents in 1969 filled the newly opened Glenwood Park at site 14, and made full use of public facilities and activities including family picnic tables and grills, group picnic shelters, fishing, nature trails, open play areas and equipment, and paddle boating.

Glenwood Park was developed through the cooperation of SCS and the Mercer County Court. Site 14 plays a role in a system of structures that provides drinking water for more than 40,000 people and makes

sewage lagoons practical for some 6,200 people. In addition, it provides flood protection for industrial development in the flood plain.

Attendance at Glenwood Park totaled more than 31,000 during the 1969 recreation season. A 50-cent entrance fee (or 25 cents per individual) is charged each family at the gate. Additional revenue comes from the \$10-a-day reservation fee

for using the group picnic shelters. Bo Bowman, Glenwood Park director and Mercer County school teacher, says that the shelters were booked up for every Saturday and Sunday all season.

Boats were available for rent by the hour. A sporting goods store in Princeton operates as a concessionaire to provide row boats, canoes, and paddle boats. The concessionaire and the county court share equally in the income and the expense of the boats. About 16 percent of the park visitors rented a boat during 1969.

Since SCS cost-sharing was not available for playground equipment when this project was planned, income from the park fees is returned to Glenwood Park to buy necessary equipment and to pay salaries of four Neighborhood Youth Corps employees.

Site 14's Glenwood Park does not end recreation plans for Mercer County citizens. A recreation plan already is prepared for site 15. Experience from Glenwood Park provides the new recreation plan with more public services. ♦



Neighborhood Youth Corps boys clean up the picnic area.



Mulch tillage in Missouri

By H. Allen Nottorf

Conservation agronomist, SCS, Columbia, Mo.

Farmers in the "Show Me State" are showing interest in reduced tillage systems.

Lower operating costs, conservation potential, and equivalent yields appeal to those who now use "no-till" planters.

A combination of properly spaced terraces and tillage methods which leave large amounts of shredded plant material throughout the year offers a tremendous opportunity for effective erosion control on sloping land. But of the half dozen no-till planters sold in the state during the spring of 1968, most were purchased to reduce crop production costs. They were used on flatland where erosion was not a primary consideration.

Several farmers planted soybeans in standing wheat stubble immediately after harvest to take advantage of firm, moist soil that would have been degraded by further tillage. As

This corn, slot-planted in tall fescue sod, yielded 155 bushels per acre.



Soybeans in these plots on Bradford Farm at the University of Missouri were no-till planted in a new seeding of timothy. Wheat was previously green chopped and timothy broadcast in the wheat during early spring.

a result one eastern Missouri operator brought in 46 bushels of soybeans per acre.

The "no-till" planter has also been used to plant in grass sod, alfalfa, redclover, and cover crops. It is usually essential to use a quick-killing herbicide because a vigorous cover crop competes with corn seedlings for moisture. Such competition either prevents a stand or retards corn growth in the western Corn Belt.

For most of the Missouri innovators, timely planting and adequate herbicide produced yields comparable to those by traditional methods. However, plots planted late in heavy sod without enough chemical weedkiller failed completely.

Corn that was "no-till" planted in old fescue sod on the Bradford Farm at the University of Missouri in 1968 made 155 bushels per acre and matched yields of other planting

methods. It took 2 pounds of atrazine and one-half pound of paraquat applied at planting time to kill the sod.

With this method complete control of weeds by herbicide is essential. Residues in and between rows make conventional cultivation for weed control difficult. But, it is worth the saving in time, effort, and soil to leave surface debris in place.

The USDA Agricultural Research Service reports that varying tonnages of crop residues reduce erosion to about one-half to one-tenth of that expected in fields where plows bury natural mulch.

However, conservationists do not believe that reduced tillage is the sole solution to the problem of soil loss from cropland. Reduced tillage is not a substitute for terraces, but it allows them to be set further apart. Operators may then use modern implements that span more rows and spare them time and money. ♦



SCS District Conservationist Rex Johnson examines heavy corn stalk residue in 20-inch rows.

Nursery furnishes windbreak plants

California

Windbreak, wildlife, and erosion-control plants adapted to the high desert are important products of a nursery operated by the Antelope Valley Soil Conservation District.

Hot summer winds off the Mojave Desert, wintry blasts, and strong westerlies in the spring make windbreaks almost a necessity for rural homeowners. Many have found that such an investment increases property values and makes their homes more salable.

The sight of attractive, hardy trees beside some homes has encouraged other owners to plant, too. More than 1,400 acres of farmstead windbreaks and 150 miles of field windbreaks have been established in Antelope Valley.

Each year, the nursery produces as many as 150,000 plants for local cooperators and other districts throughout the state. Among the many varieties it offers are:

Incense cedar; Aleppo pine; Arizona cypress—a rapid-growing conical tree; and Evergreen tamarisk—a salt-tolerant tree commonly used in saline-alkaline areas.

5-year-old Arizona cypress windbreak on the Taggart farm.



Tour of townspeople and ranchers on Woodruff ranch.

The nursery sells deciduous trees bare-root, but because of climatic limitations, evergreens are sold in plant bands and cans.—ERNST PASCHKE, *soil conservationist, SCS, Lancaster, Calif.*

Texas

Grass ignores precedent and thrives on "wasteland"

To their astonishment, a Texas couple converted 200 acres of land covered with brush and silt to some of the best grassland in the county in less than a year.

With the help of a Great Plains Conservation Program contract signed in November 1965, Mr. and Mrs. George Woodruff of the Lower Clear Fork Soil and Water Conservation District replaced tangled mesquite, catclaw, blue brush, and cactus with lush forage.

In February 1966, the area was rootplowed and seeded to a mixture of King Ranch bluestem, sideoats grama, and blue panicgrass. A GPCP cost-shared fence that protected the young stand was later used to distribute grazing evenly.

During the next 2 years, another 240 acres of pasture was treated with equal success. Woodruff also grubbed and seeded an additional 120 acres.

All pastures are rested from April 1 until the first fall frost after brush control and seeding. Proper grazing management has meant doubled

livestock population and more forage each year.

Brush on hillsides and other areas left as wildlife habitat now support more deer, quail, turkeys, and other species. Four livestock ponds stocked with fish provide many hours of fishing for the Woodruffs and their friends.—JOHN S. WILLIAMS, *district conservationist, SCS, Breckenridge, Tex.*

New Mexico

Camp attracts youth, teaches conservation

Conservation education in southern New Mexico's Sacramento mountains found an eager audience of at least 15,000 youngsters during the summer of 1969.

The estimate covers recreation camp attendance only and does not include the hundreds of visiting family groups whose numbers are growing every year.

Cloudcroft alone claims a half dozen major camps operated by the Boy Scouts, YMCA, and church groups. All have heavy summer schedules, crowded with youngsters from throughout the Nation—many who have never seen mountain scenery.

Most, if not all, counselors and camp directors teach nature studies and conservation, while the youngsters are also enjoying the outdoors. Conservation is a practical matter at the Southern Baptist Convention's



Dam in the main channel of Little Hoosic River.

Royal Ambassador Camp, where youth-built rock dams in the Cox Canyon Arroyo already show effective erosion control.

Gene Whitlow, a Las Cruces, N. Mex., school teacher and part-time SCS employee, assisted several camps' staff in teaching conservation practices. Whitlow also taught Girl Scouts at the Tall Pine Camp how to identify plants and wildlife along the camp's nature trails.

While commercial and residential development continues in southern New Mexico, conservationists are looking to outdoor recreation areas where youth can be taught the importance of keeping the environment clean and enjoyable.

New York

Pilot project still stimulating growth

Business in Berlin, N.Y., has been better in the very areas where the Little Hoosic River was once most damaging.

A 2-story commercial bank is going up on a site where at least one shopkeeper once closed early rather than stay around to get wet another time. An auto body shop, town garage, school garage, telephone substation, and expanded lumber yards have been built on river banks made safer by flood-retarding structures and land treatment upstream.

The community in eastern Rensselaer County has not been flooded

since the completion of a watershed project during the 1950's, although it is not protected from the larger and more infrequent storms.

Gravel trapped by five debris dams built with the help of the Soil Conservation Service is used on town roads. One of the dams is a place for supervised swimming. The Agricultural Research Service uses another as a site for waterflow measurement.—JOHN F. NIGRO, *district conservationist, SCS, Wynantskill, N.Y.*

Colorado

Commercial bird ranch finds pheasant market

After 3 years of study and experimentation, Jim and Bette McCullough of Montrose, Colo., felt ready to establish a commercial game bird farm. Unlike others in Colorado, they intended to sell dressed birds to restaurants and hotels.

In late 1967, SCS helped them develop a conservation plan to provide swimming areas for waterfowl and good ground cover for pheasants. Wide, flat-bottomed ditches—less expensive than ponds—provided adequate water by means of simple gated structures for filling and draining. Trees, shrubs, and an alfalfa-brome grass mixture provided shade, wind protection, and pheasant cover.

More than 3,700 of the first

pheasants were marketed at 12 weeks of age—4 weeks earlier than anticipated. He kept a small breeding flock, reported death and culling losses to be 8 percent, and declared a profit in his year-end records.

More development—pens, ditches, plantings, incubator—is planned shortly for McCullough's Thunderhead Bird Ranch. Eventually, McCullough plans to keep 500 brood pheasants and to market several thousand young birds annually. He maintains an outside income until his game bird operation can become sufficiently developed.—DONALD A. TETSELL, *district conservationist, SCS, Montrose, Colo.*

North Dakota

Dakota fishermen catch an 'impossible dream'

A trout pond on the North Dakota prairie? Velva, a small community on the Souris River, prides itself on accomplishing the impossible.

In early 1967, the Velva Sportsman's Club proposed the construction of a dam for fishing and other outdoor recreation. SCS found the proposed site well suited for a trout pond. Federal and state agencies, as well as local business firms and individuals were asked to share construction costs. Landowners Glenn Miller and Lynn Rogers donated the property for the dam and lake site.

SCS technicians, working through the district, designed the dam and provided technical assistance for construction. The Agricultural Stabilization and Conservation Service furnished 80 percent—or \$7,200—of the construction cost, while the North Dakota Game and Fish Department supplied the trout and \$1,200 more. Total cost of the 6.6-acre Velva Dam and lake was approximately \$10,200.

Since its dedication in late 1967, Velva's Future Farmers of America have built picnic tables. Grass seed, fencing materials, and labor have been donated by club members and local businesses. More than 2,500

rainbow trout were released in 1968 and ever since the Velva community has invited visitors to see their impossible dream.—DANIEL J. KELNER, *technician, SCS, Velva, N. Dak.*

Wisconsin

Highway commissioner wants conservation help

Conservation cut maintenance costs for the Jefferson County, Wis., Highway Commission last summer in spite of near-record rainfall.

"In many places we had to clean several inches of dirt and stones off roads at considerable expense to the county," Commissioner William F. Scherwitz said in a letter to Keith Kreger, SCS conservationist assisting the Jefferson County Soil and Water Conservation District.

"But where your organization has helped farmers develop complete soil conservation programs, the water is clear, roadside ditches are intact, and there is practically no silting."

Commissioner Scherwitz mentioned gullying and topsoil loss that occurred after heavy rains hit cornfields planted up and down hill and places where sod waterways had been sacrificed for a few more ears of corn.

"It causes us to wonder what these lands will produce for future generations," the commissioner said.

In concluding his letter, Scherwitz added that he wished more people would "avail themselves of the opportunity for assistance. We could all be better off. ♦

Timber sold in 1969

The Forest Service reports 18.9 billion board feet of timber was sold in 23,418 sales during fiscal year 1969. More than 20,000 of these sales were designed for the small timber operator. Timber receipts in 1969 were at a record level of \$306.8 million—an increase of \$101.2 million over the previous year. ♦

Meetings . . .

Wildlife Conference on man's environment

"Man's Stake in a Good Environment" is the theme of the 35th North American Wildlife and Natural Resources Conference on March 22–25, in Chicago, Ill.

The principal subject of the two general sessions will focus on the conservation and natural resource problems arising from the steady expansion of population and development. The principal topics are "Population and the Environment;" "Filth in Lake and Sea;" "Agricultural Pollution;" "Outlook for Maintaining and Improving the Environment;" "Responsibility of Industry in the Environment;" "Cities are Part of the Environment, Too;" "Reaching the People;" and "The Fight Must Go On."

The conference's six technical sessions will feature nearly 50 speakers on many phases of wildlife research and management.

Contractors to view latest equipment

The 51st Annual Convention of the Associated General Contractors of America will take place March 6–12 in New Orleans, La. The exhibit will be the biggest equipment showing ever held at an AGC convention. Some 63 exhibitors will show their newest construction equipment.

Speakers are to present the latest information on legislation, economics, and industry conditions.

Association features man in tomorrow's world

The 25th annual conference of the Association for Supervision and Curriculum Development March 14–18 in San Francisco, Calif., will offer members new ideas and opportunities for "positive and constructive curricular changes, school programs, education arrangements, and procedures in direct response to the needs of all learners and the im-

provement of our social order."

Three general sessions will explore the conference theme, "A Man for Tomorrow's World."

The Curriculum Materials Exhibit includes the most recent instructional materials, curriculum bulletins, and courses of study from school systems, state departments of education, and colleges and universities throughout the country.

"Change" challenges the American Roadbuilders

American Roadbuilder's Association gives the green light for a hard-hitting program built on the theme, "The Challenge of Change," for its annual convention March 1–5, New York.

The broad dimensions of the Nation's transportation problems will be outlined at three general sessions. Two specific problems, identified as critical, will be given a searching analysis in workshop sessions. The first problem is that of manpower, including engineers, engineering technicians, and construction labor; the second is construction safety.

Dates and places

March 1-5, American Road Builders' Association, New York, N.Y.

2-6, American Society of Photogrammetry, Washington, D.C.

6-12, Associated General Contractors of America, New Orleans, La.

11-14, National Farmers Union, Denver, Colo.

13-17, National Science Teachers Association, Cincinnati, Ohio.

14-18, Association for Supervision and Curriculum Development, San Francisco, Calif.

15-19, American Concrete Pipe Assoc. Technical Conference, New Orleans, La.

16-18, American Pulpwood Association, New York, N.Y.

20-22, National Wildlife Federation, Chicago, Ill.

20-26, Lawn and Garden Week

21-23, The Wildlife Society, Chicago, Ill.

22-25, North American Wildlife and Natural Resources Conference, Chicago, Ill.

April 1-3, Engineering Geology and Soil Engineering annual symposium, Pocatello, Idaho.

4-9, American Society of Planning Officials, New York, N.Y.

19-23, Urban Land Institute, Honolulu, Hawaii.

28-29, Weeping Lovegrass Symposium, Ardmore, Okla. ♦

Review



Garbage as You Like It. BY JEROME GOLDSTEIN. 1969. *Roddale Books, Inc.* Emmaus, Pa. 243 pp., illus. \$4.95.

New thinking and daring experimentation are needed in these United States in dealing with the waste-disposal problem. This is author Goldstein's proposition.

He tells of a housewife—a rather indolent sort—who when asked how she disposed of her garbage replied she just kicked it around until it got lost. And that, according to the author, is what we in this country have been doing all this time.

Our garbage, at the rate of a ton a year per person, comes back to haunt us in the water we drink, the air we breathe, and in the ugliness we live with.

Really, it isn't at all necessary, Goldstein points out. It is proved to be economically profitable for communities to dispose of waste in a way that will present no problems to anyone.

Composting, not especially a new idea, is the sorting out of elements that can be reused—used in many ways. Some cities have broken the barrier already, or a part of it. Houston gets \$11 a ton for its tin cans. Houston and Chicago sell processed fertilizer. For almost everywhere there is a market.

What's needed, the author points out, are laws and a willingness for officials to seek the techniques needed to solve the problem and answer New York Mayor John Lindsay's question: "What are we going to do about all that garbage?"—TARLETON A. JENKINS, *Information Division, SCS, Washington, D.C.*

New publications

The Story of U. S. Agricultural Estimates. BY U. S. STATISTICAL REPORTING SERVICE. 1969. *USDA Misc. Publ.* 1088. 137 pp., illus. \$1.75. A concise history of the Statistical Reporting

Service, Economic Research Service, and their predecessors. Traces the development of data-gathering and reporting from animal inventories on colonial New England tax lists to current electronic data processing methods. Studies by agricultural societies, agricultural surveys, censuses, and annual state crop production estimates were recorded even before the USDA was established in 1862.

In addition to facts and philosophy behind the figures, SRS provides a clear picture of the legislation and reorganizations that led to its creation in 1961. In each of three major time segments (1862-1905, 1905-30, 1930-66), the authors weave the story of agricultural statistics into a chronological overview of American agriculture and related businesses and how they grew into the Nation's largest industry.

Windbreaks for Conservation. BY ARTHUR E. FERBER. 1969. *USDA Agr. Inf. Bull.* 339. 30 pp., illus. Windbreaks in fields are most needed where wind erosion is a problem in parts of the vast Great Plains; on the sandy and muck soils in the Great Lakes region; on sandy soils along the Atlantic and Gulf seaboard; and in the irrigated valleys of the Pacific southwest and the Rio Grande, Colorado, and Columbia River basins. They are not only being used in the North and West but are useful in almost every state—even in the Deep South. And they are just as valuable to the country homeowner as to the farmer.

This bulletin, superseding Miscellaneous Publication 759, *Windbreaks in Conservation Farming*, gives the latest information on windbreaks. It also presents a "wind-chill index" table based on a study by U. S. Army research teams of the chilling effect of wind on the human skin.

Soils as an Engineering Material. BY WESLEY G. HOLTZ. 1969. *U.S. Department of Interior, Bureau of Reclamation Water Res. Tech. Pub. Rpt.* 17. 45 pp., illus. \$0.55. Presents the history and the continuing need of soils engineering research; the many and varied forming processes of soils that call for an investigative job of the soils engineer; and the need to consider geological history, present conditions, construction sequences, and anticipated operating conditions to obtain meaningful data for the design of earth structures and foundations. Illustrated by several photographs showing construction failures because of the soils.

Catfish Farming, A New Farm Crop. BY ROY A. GRIZZELL, JR., OLAN W. DILLON, JR., AND EDWARD G. SULLIVAN. 1969. *USDA Farmers' Bull.* 2244. 22 pp., illus. \$0.15. A catfish farm needs

a water-distribution system, convenient drainage facilities, and complete protection against floodwater. This bulletin discusses the production of channel catfish, blue catfish, and white catfish and goes into detail about the number and size of ponds, water supply, selection of species, stocking, feeding, and harvesting. Several tables are presented on different stocking rates, number of fish per pond, and monthly feeding schedule.

Answers to Your Questions About American Indians. 1968. *U.S. Dept. of Int., Bureau of Indian Affairs.* 42 pp., illus. General information on Indian lands and people, legal and economic status, education, health, enforcement on reservations, and the Bureau of Indian Affairs. Suggests other sources for further study of culture, history, crafts, and Indian lore, including selected ding lists for adults and younger students. Indian publications and a list of addresses of better-known museums with Indian collections complete this concise, packaged overview of the subject.

Water Use: Principles and Guidelines for Planning and Management in Wisconsin. EDITED BY RUTH L. HINE. The demand has been so great for this booklet, announced in *Soil Conservation* for December 1969 as being free on request, that a charge of \$1.00 a copy has been placed on it. It can be ordered from Wisconsin Chapter, Soil Conservation Society of America, P. O. Box 511, Madison, Wis. 53705.

America's Department of Natural Resources . . . the U.S. Department of Interior. (1969) *U.S. Dept. Int.* 47 pp., illus. \$0.40. A description of the Department of the Interior, its organization and activities, with emphasis on the conservation function.

Developing Campgrounds for Recreational Vehicles. 1969. *Wisconsin Bureau of Commercial Recreation, (Madison). Recreational Development Series* 2. 23 pp., illus. Presents statistics on the numbers and types of recreational vehicles; camp design and layout; rates and expenses, and costs per campsite.

The Right to Exist. No date. *U.S. Dept. Int. Bureau of Sport Fisheries and Wildlife.* 12 pp., illus. A beautifully illustrated report on endangered wildlife.

Soil surveys

Carroll County, Maryland. BY EARLE D. MATTHEWS. 1969. 92 pp., illus.; with maps 4 inches to the mile (1:15,840). Surveyed by Merl F. Hershberger, Richard H. Anderson, R. A. Foster, L. W. Ilgen, R. S. Long, F. G. Loughry, J. E. McDonald, J. B. Rayburn, Elmer F. Sauer, J. D. Sheetz, W. G. Souder, David C. Taylor and Philip J. Walter.

Recon . . .

A quick overview of the conservation scene

The first reasonable estimate of streambank erosion for the "Nation" went on the books this fall after the Corps of Engineers completed a study authorized by the River and Harbor Act of 1968 (Public Law 90-483). Results show that out of 7 million bank-miles of streams in the United States, some 549,000 bank-miles are currently showing some degree of erosion. Of these, nearly 148,000 are experiencing serious erosion resulting in \$90 million in damages annually.

Some scientists have estimated that multiple reuse of water will be necessary by 1980 when water consumption for all uses will equal or exceed recoverable streamflow and ground-water supply. To date, plant-soil filters are the cheapest ground-water recharge method produced in response to that dire prediction. Cost of treatment: \$5 per acre-foot compared to \$50 per acre-foot for chemical methods.

Comment on nitrates

Commercial fertilizer poses no additional threat to our environment unless it is applied in excess or at the wrong time of the year. Such management failures that result in nitrate losses can be avoided if agronomists and fertilizer dealers take water quality into account when making recommendations. Many fertilized fields contribute less nitrate to streams and underground water supplies than they did several years ago.—B. A. STEWART, *USDA Agricultural Research Service, Bushland, Tex.*

Thanks to their farsighted landlord, some New York City apartment dwellers may someday have access to second homes in Massachusetts. The owner plans to construct one cottage for each 10 acres on a 160-acre tract for clients who occupy his NYC apartments. Wildlife areas, trails, and nature study sites are to be included, according to the Berkshire, Mass., DC. State Conservationist Benjamin Isgur says it "looks like a captive market—could be profitable!"

Conservation—jobs

Except for the Civilian Conservation Corps program of the 1930's, conservation needs have not been widely hailed as an economic opportunity. The millions of man-days of labor necessary to accomplish conservation objectives has at times seemed an insurmountable hurdle. In our present dilemma of growing technological unemployment, conservation needs are an asset also because they provide the worthwhile employment necessary for equitably distributing a high standard of living.—S. BLAIR HUTCHISON, *assistant director, Intermountain Forest and Range Experiment Station, U.S. Forest Service, Ogden, Utah.*

Two brand new district newsletters captured both first and second prizes nationally in the annual NACD-FIEI contest this year. Naturally, they also won first and second place in the "new newsletter" category. National winners were: Allegheny County, Pa., SWCD, first; Teton County, Wyo., SWCD, second; and Anderson County, S.C., SWCD, third. The district in Morrison County, Minn., won third place among new newsletters. Awards were presented in San Francisco last month by the Farm and Industrial Equipment Institute during the NACD meetings.

Urbanization heats up the environment, says a University of Maryland scientist. In Columbia, Md., surface temperatures in the middle of the much publicized new town

are 10 degrees higher than in surrounding woods and fields. Also, the population of a few thousand has boosted the amount of air pollutants in the 2-year-old town by more than 10 percent.

The hour is upon us

We are the "next generation" that conservationists talked about 30 years ago. Suddenly, good resource use is not only something vital to our grandchildren, but vital to us. Suddenly, that vague tomorrow is today. And the real tomorrow—that we had better start planning for right now—is only the rest of this century.—NORMAN A. BERG, *associate administrator, SCS, to the Arkansas Association of Conservation Districts.*

Response to the proposed national Environmental Teach-in (April 22) confirms public interest in conservation revealed by a recent Gallup poll on environment. Coordinators in Washington, D.C., have heard from every state, including at least 300 campuses. Local organizers are encouraged to involve communities as well as colleges. Those who want to find out what's going on in their area can do so by contacting Environmental Teach-In, Inc., Room 200, 2000 P St., N.W., Washington, D.C. 20036 (202-293-6960).

Utilize youth, women

Urban People—especially young people and women of all ages—are interested in conservation. I think many of them are motivated enough to act if they are given a meaningful job to do. District leaders can make sure that newcomers to conservation are informed and given a piece of the action.—KENNETH E. GRANT, *administrator, SCS, in talk to Oklahoma district supervisors' association.*

From the Administrator:

Decade for people and wildlife

Clocks, calendars, and history books are artificial things. Man has designed them in an attempt to organize his thoughts and actions and perhaps delude himself into thinking that he has some measure of control over the passage of time.

Creatures who live close to nature, of course, know better. They do not waste time in philosophizing on milestones of history, but concern themselves with adapting their actions to make the best use of what they find in their environment. The primary concerns of deer are how to find the food and shelter needed to survive, grow, and reproduce. This is true in spite of our occasional inclination to believe that they keep track of the opening and closing dates of the hunting season.

So, in many ways, the change from 1969 to 1970 is an imaginary thing. We chuckle at the lady who sighed on New Year's Eve, "I'm sure glad the sixties are over with; I don't think I could stand them much longer!" We do, however, face many new problems and opportunities in the seventies that we hardly dreamed of 10 years ago.

For one thing, we have developed deep national concerns over the pollution of our water, air, soil—yes, even our plants and animals—with the waste products of our own "civilization." One of the most hopeful signs of the times, as an aid to solving these problems, is the growing realization that human beings, like wildlife, are subject to the laws of nature.

This is why I believe we may be entering on a new decade for wildlife as we strive to meet people's needs and desires more adequately. Our efforts to maintain a clean, healthy, and beautiful environment for ourselves are bound to produce an improved environment for wildlife. And we are beginning to realize that just as wildlife needs our help, we, in turn, need the benefits that come from healthy, plentiful populations of wildlife.

We have always treasured the tradition of a Nation of outdoorsmen—hunters, trappers, and fishermen. But we also know that wildlife

is important to many other segments of our population. For example, I know of a campground operator who counts wildlife as one of the prime attractions for her campground. She tells of one family who will never forget the morning when a family of baby wood ducks fluttered down from their tree nest onto the picnic tables at breakfast time.

This realization that all of our resources, including wildlife, are part of a vast complex ecological pattern is reflected in the increased emphasis being placed on comprehensive planning at all levels of government. The Soil Conservation Service, along with other agencies concerned with natural resource conservation, can help insure that wildlife and its environment receive adequate consideration in the formation of these comprehensive plans. I have instructed our biologists and related resource specialists to assign a major part of their time to assisting with this type of long-range planning.

We realize, of course, that the success of such planning depends on the wholehearted cooperation of all individuals, agencies, and organizations concerned with conservation of natural resources. We pledge to join with other interests in constructive efforts in the seventies to make sure that fish and wildlife will be given major attention in planning our future environment.

Kenneth E. Grant

If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

Plants for city dwellers and birds

People who live in the city can have songbirds in their own yards if they plant such shrubs as Cardinal autumn olive, Amur honeysuckle, or Washington hawthorne.

These three excellent ornamental plants, among many others, were evaluated and made available to state and commercial nurseries by the Soil Conservation Service plant materials centers. The plants were developed specifically for erosion control but were found to be also useful as wildlife food and cover or game management areas and on farms planning wildlife areas.

Demands for screening materials and the need for small shrubs for other urban uses stimulated the evaluation of these plants for the "block dweller." They have interesting leaves and brightly colored fruits and flowers.

People found that the plants worked out very well, but the exciting part is that where these plants were established, robins, cardinals, cedar waxwings, bluebirds, and many others moved in and made their homes.

Autumn olive and Amur honeysuckle have been used as screens and hedges between residential yards and roads, to screen off commercial developments, and to provide more individual privacy to homeowners in towns and suburbs.

By including these plants in a

landscaping plan, a city dweller who has a lot 60 x 80 feet can bring a bit of natural woody loveliness and birdlife to his own backyard.

Some people even like the taste of Autumn olive, and people themselves may end up being the chief competitors of the birds for the sweet, crisp, tart red fruits. The berries make an excellent jelly, and individual plants have yielded as high as 150 pounds of fresh fruits when picked in the fall.—SYLVAN T. RUNKEL, AND B. H. ROUNDTREE, *conservation biologist, Des Moines, Iowa, and plant materials specialist, SCS, Elsberry, Mo.* ♦

Flowering Elsberry autumn olive (top) and Mich-77 autumn olive shown with weeping willow, walnut, and poplars make good wildlife cover and attractive screening shrubs.



Soil Conservation

Devoted to the wise use of land and water resources

FOR A BETTER ENVIRONMENT

Stream cleanup
Strip-mine restoration
Youth activities
and other examples

Soil Conservation Service, U.S. Department of Agriculture



Soil Conservation

Devoted to the wise use of land and water resources

Vol. 35, No. 9 April 1970

Concern . . .

The current groundswell of concern with quality of the human environment brings us an exciting selection of contributed articles this month.

Positive gains at the ground level are being made by citizen efforts to clean up a stream in a conservation district (p. 195), a mining company's reclamation of strip-mined land (p. 200), and a small city's resource development plan (p. 201).

A selection of examples (p. 197-199) of action by and with young people—who have the most at stake in the matter—indicate the depth and range of the movement.

Who is to say that activities like these, originating naturally in conservation districts, have not been a strong force in today's eruption of awareness of environmental deterioration?

Let's hope the same force will be harnessed to constructive conservation action.

COVER: Our new symbol, featured on this month's cover, had an auspicious birth.

It won first prize for symbol design from among 100 entries in the 1969 Competition of the Society of Federal Artists and Designers.

Three independent judges (all designers from outside the Federal Government) selected it on the basis of aptness, strength of design, and originality.

The symbol also won Best of Show for Graphic Design, the highest award in the competition. Designer was Gordon Thomas of the USDA Exhibit Service.

The symbol can be used in black-and-white or in color. Official colors are electric blue for the falling droplet, apple green for the contour band, and black for the background field.

The design is interpreted as meaning that soil and water conservation involves controlling the force of falling rain and running water with vegetation and structures in combination.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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A district starts stream cleanup

By Robert A. Speich
RC&D project coordinator, SCS,
Princeton, W. Va.

West Virginia's East River is first target of new environmental improvement association

Trut and trout fishermen returned to Pigeon Creek in Mercer County, W. Va., this spring as a result of citizen efforts to clean up the stream.

The West Virginia Department of Natural Resources dropped Pigeon Creek from its stocking schedule in the early sixties because the waters had become so foul they no longer were suitable as trout habitat.

The little stream was the first target for concentrated effort in a program initiated by the Southern Soil Conservation District to rid its streams of pollution and improve the general environment. Sufficient progress has been made that the state fish hatchery people resumed monthly stocking of the stream in February of this year, to the delight of local anglers.

Pigeon Creek is a tributary of East River and typical of the pollution problems of the region. Its headwaters rise from a limestone

spring in the railroad yards of Bluefield, W. Va. Along major stretches of its banks are railroads, highways, and ribbons of residential and industrial development. There is no central garbage disposal system in Mercer County and municipalities dump inadequately treated waste into the water. Mud from roadbanks and eroding farmland of the 46,000-acre drainage area clogs its once popular swimming and fishing holes.

When the Mountain-Dominion Resource Conservation and Development Project was organized, the Southern District board of supervisors proposed a project measure to clean up the East River. In February 1969, they helped organize the East River Improvement Association. Under the leadership of Board Chairman J. R. Keatley and Supervisors Dr. Daniel Hale and Dr. Meade McNeill, they established 14 resource committees

Ten truck loads of trash was gathered and hauled away from the trout stream.





A 75-man crew worked 2½ hours to remove trash from a 1-mile stretch of Pigeon Creek.

within the association to deal with different aspects of the environment. G. E. "Ed" Davis, leader of the Oakvale Ruritan Club, was elected president of the association.

Resource committees

The resource committees already have several accomplishments to their credit. In April 1969, 75 members of the Improvement Association, Ruritan Club, Interact Club, and Mercer County Anglers Club turned out to clean up Pigeon Creek. With trucks, tractors, and wreckers, they hauled 10 truckloads of assorted junk from the stream. The quality of the water was sufficiently improved that the state fishery agency resumed stocking.

Watershed treatment

Soil Conservation Service personnel assisting the district have worked with cooperators in completing seven soil and water conservation plans in the East River watershed. The plans call for practices and land use changes to reduce sediment going into the river.

Efforts of the Agriculture Committee of the association resulted in allocation of \$4,000 in special Agricultural Conservation Program funds for land-treatment measures in the watershed. The Mercer County ASC Committee matched

this with another \$4,000 of county ACP funds.

The Forestry Committee sponsored a tree-planting demonstration to encourage landowners to reforest idle acres. Service foresters of the Department of Natural Resources are making a forest resource inventory of the watershed to guide the committee in upgrading the area's woodland. Biologists of the department are working with the Wildlife and Recreation Committees studying stream conditions and wildlife habitat.

Canvass of pollution

The Division of Water Resources, using Neighborhood Youth Corps boys, conducted a house-to-house and business-to-business canvass of the pollution problem. Homeowners and business operators were asked to identify their problems of sewage and garbage disposal and their sources of drinking water. The results have been tabulated and are now being considered by the Southern West Virginia Regional Health Council in planning for a demonstration area which will provide for complete abatement of human waste pollution in the watershed. The Youth Corps boys did such an outstanding job they were asked to conduct a similar survey in the neighboring Brush Creek watershed.

West Virginia State Road Com-

mission cooperated by providing men and machinery to seed 10 acres of bare roadbanks as an RC&D project measure. The Soil Conservation Service provided technical assistance in planning the treatment program of which the seeding is a part.

Sediment and detergents

The Norfolk and Western Railway, working with the Department of Natural Resources, has begun a program to reduce the amount of sediment and detergents coming into East River from its Bluefield yards. The company has built several settling basins and has others planned. Officials are studying the possibility of spreading effluent from the Bluefield sewage treatment plant on vegetation as a "living filter" in the final step in purification.

The conservation district supervisors recently voted to form a conservation work crew for Mercer County, giving first priority to the work needed in the East River watershed. The crew will be available for hire to district cooperators to do tree planting, fencing, timberstand improvement and harvest cutting, spring development, pond construction, and many other jobs. The supervisors believe that conservation on the land will increase when a trained crew is available to do the work. ♦

Girl Scouts organize a 'hill day' to stabilize eroding slopes

One hundred and sixty tons of sediment deposited in Little Sugar Creek each year—that was the dirty record of this ½-acre gullied hill at the edge of Bellbrook in Greene County, Ohio.

Little Sugar Creek is the pride of scenic Sugarcreek Township, but the eroded area was not exactly America the Beautiful. The hill was bulldozed for a shopping center several years ago, but construction never materialized. The unprotected cut slopes became a gullied eyesore and a threat to the creek.

Girls of a local scout troop voiced their concern and their leader, Mrs. Robert M. Hunter, asked the SCS soil conservationist, "Can't something be done?"

"Yes, of course, if the owner is interested."

He was. Gomer Bledsoe became a cooperator with the Greene Soil and Water Conservation District, and his conservation plan included provisions for smoothing the gullied area, then planting trees, shrubs, vines, ground cover plants, and grass. The Girl Scouts offered their help in planting the trees and shrubs.

Four of the girls volunteered to sponsor the effort as a community service project. They notified the leaders of every Boy Scout and Girl Scout troop in the Bellbrook area of their plan and secured most of the plants used.

"Hill Day" was set for Saturday, April 26. Different troops were scheduled to arrive at the hillside every half hour and work for 1 hour. Some 300 girl and boy scouts participated during the day.

Mr. Bledsoe, the owner, did much

of the advance earthmoving, operating a bulldozer himself. He also purchased fertilizer, seed, and straw for mulch. He planted the grass and applied the mulch before Hill Day. The youngsters planted more than 400 trees and shrubs on the slopes.

Erosion of the hill is now halted. Today the area has a new look to complement the surrounding hills of Sugarcreek Township.

The area will be a real test plot, too, because of the variety of plants used. Kentucky 31 fescue and crownvetch were seeded over all. Trees, shrubs, and other perennials were planted in selected areas. They include: autumn olive; white, red, and Austrian pine; Norway spruce; iris; dogwood; junipers; and ivy and myrtle vines.—DONALD W. JACKSON, *district conservationist, SCS, Xenia, Ohio.*

Girl Scouts, dismayed at erosion on an unused building site, helped plant trees after slopes were shaped and sodded.



Students stage a 'TRASH BASH' work for habitat preservation

Twelve hundred students rallied in front of the University of Maryland's administration building last May—but not to tear it down. Their mission was to clean up the 1,300-acre campus around it.

The Saturday "Trash Bash," sponsored by the North American Habitat Preservation Society (a student-run organization), was "an all-out effort to show the American people that college students are willing to work for changes," according to R. Doyle Grabarck, NAHPS president and founder.

School officials were pleased by results of the 1-day war on litter. "It was an excellent expression of cooperation from both sides," Dr. Walter B. Waetjen, vice president for administrative affairs, said. "We were delighted to provide the logistic support requested by students for this project."

As nine 5-ton trucks followed them around most of the day, the volunteers—more than half of them coeds—picked up more than 17 truck loads of loose trash. Group leaders helped make sure the campus was covered thoroughly.

Grabarck, a graduate student, and Joanne McKenna, sophomore, were recognized by the Maryland Environmental Trust for their successful effort to "nudge student potential in the proper direction." Both received the Governor's Environmental Trust Citation last Sep-

tember. Although the society surfaced to promote and carry out the public pickup project, most of its work goes on with less fanfare. Most of its plans revolve around far-reaching issues related to environmental protection and public information.

Other projects include:

- raising funds to buy second-hand printing equipment for publishing conservation pamphlets;

- planning a free course on environmental problems this summer at the University of Maryland;

- circulating petitions asking the Maryland Department of Water Resources to deny permission to operate a controversial nuclear power plant until company officials certify their intent to provide optimum protection for the Chesapeake Bay;

- drafting and circulating a petition to the United Nations urging accelerated, unified efforts to achieve "a goal for this millenium . . . the family of man living in balance with its environment in a world of peace;"

- presenting plans for a computerized Business Environmental

Research Center to 170 major corporations;

- and defending environmental quality in court (e.g. a case against developers near Ocean City, Md., for filling marshes).

Grabarck's staff of 15 students and school teachers handles the society's printing and paperwork in Adelphi, Md., near the campus. The office is open and busy 7 days a week—and often as long as 17 hours a day, according to the schedules and stamina of the workers.

NAHPS was incorporated in Pennsylvania last March as a tax-exempt organization to encourage pollution-control programs that emphasize prevention rather than cleanup; to oppose production-consumption patterns that lead to plenty of pollution in this land of plenty; and to foster the notion that the costs of pollution control are not prohibitive.

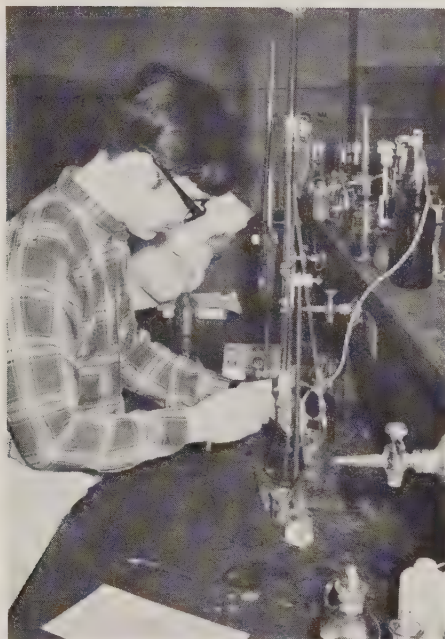
Today 60 percent of the 4,300-plus Maryland residents who belong to the society are under 30. Although students deal with the everyday work and worry of running NAHPS, many other talented men and women give free advice, often on short notice.

"A belief strongly held by this society is that we in the United States have the brains, the technology, and the money to develop our industries without raping nature," Grabarck said.

Organizers of the "Trash Bash," R. Doyle Grabarck and Joanne McKenna (second and third from right), were presented the Governor's Environmental Trust Citation by Mrs. Randolph W. Jones, the Governor's administrative assistant. Looking on are University of Maryland President Dr. Wilson H. Elkins (left) and Vice-President of Administrative Affairs Walter B. Waetjen.



Young people are concerned . . .



Students check water samples for dissolved oxygen and biological oxygen demand.

Chemistry class mounts crusade against pollution

Chemistry students at Bridgeton, N.J., High School are doing more than just talk about pollution. They've started a full-scale technical research study of water-pollution problems of the Cohansey Creek, the principal watershed in their community. Under the leadership of Arthur E. Knudsen, Jr., their chemistry instructor, a group of senior high chemistry students initiated the group study of their community's water problem.

The New Jersey Department of Education provided a \$1,000 "mini-loan" to help the Chemistry Department defray the costs of the research.

To gain background for their research, students reviewed literature, visited industrial facilities, and talked to qualified professionals.

Now, students weekly sample the

river at designated sites and test for biological oxygen demand, dissolved oxygen, presence of detergents, acidity, bacterial count, and "stability," a test for effective treatment.

"Transforming theoretical science into a practical topic is what it's all about," says Knudsen. "To arouse

the public by providing them with conclusive evidence of pollution is an imposing goal. Youthful enthusiasm, understanding, guidance, and expanded opportunities will achieve it."—JAMES S. WASSON, *district conservationist, SCS, Bridgeton, N.J.*

Students survey litter by schools

A month's accumulation of four bushel-size boxes of cans, bottles, paper cartons, and other items that motorists discard were collected by students at Short Mountain Elementary School in Cannon County, Tenn., from 540 feet of frontage along State Highway 146.

Principal Kenneth Muncy made an exercise in conservation for the seventh grade out of the cleanup. The students separated, counted, and weighed the collected waste. They measured the road distance bordering on the school grounds. Then they calculated the number of pounds of waste along 1 mile of highway, along roads throughout Cannon County, and the cost per

mile of cleaning up all the waste.

The students interviewed highway maintenance workers about the county's trash-littered roads. Muncy, who is a member of the Cannon County Soil and Water Conservation District Board, believes that children should start learning about the need and importance of resource conservation while they are in the lower grades.

In addition to the antilitter campaign, pupils are encouraged to take an active part in tree planting, school ground beautification, Arbor Day ceremonies, and other conservation activities.—WILLIAM L. CLEMENT, *district conservationist, SCS, Woodbury, Tenn.* ♦

Roadside litter gives seventh graders something to figure on.





At left, the area to the rear has been smoothed and reclaimed while mining continues in the foreground. Since the picture was taken, a golf course has been built on the area. Below, earthmovers strip away overburden to reach phosphate.



Phosphate companies succeed in surface-mine reclamation

By John B. Reed

District conservationist, SCS, Lakeland, Fla.

Surface-mining in Polk County, Fla., produces the Nation's highest phosphate yields and some of the ugliest scars on the landscape of the Sunshine State. But new methods, initiated in the early sixties, combining restoration with the mining operation, are reversing the trend.

Giant draglines, whose maws gobble up 45 cubic yards of earth in a single bite, work continuously feeding rock to pipelines that carry it to processing plants. Filling, grading, and revegetation follow close behind the excavation.

The phosphate companies, cooperators with the Polk Soil and Water Conservation District, receive assistance from the Soil Conservation

Service in planning for reclamation of the surface-mined areas. Conservation plans are also being developed on areas not immediately scheduled for mining. More than 1,000 acres a year are being planted to pine seedlings.

Trial plantings of grasses and legumes have been made to test their adaptability to the revegetation pro-

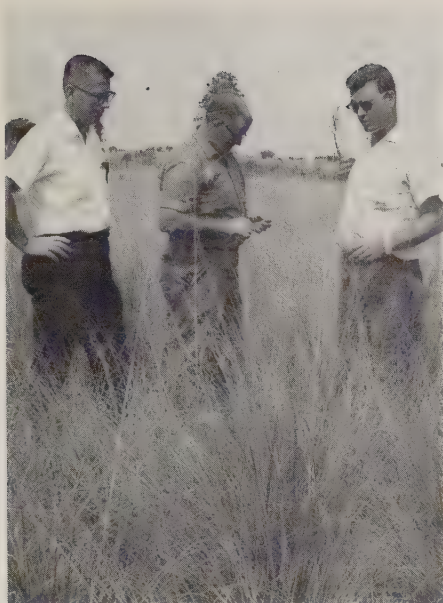
gram for reclaimed areas. Plant materials supplied for evaluation by the SCS Plant Materials Center at Brooksville, Fla., include buffelgrass, Texas millet, signalgrass, giant lovegrass, Arb peanuts, joint-vetch, and a recently introduced grass, *Hemarthria*.

Under new procedures, all land that is mined is reclaimed except areas needed for settling waste colloidal clay and for water conservation basins. Large tracts of minable land are first divided into smaller segments, and work is concentrated on a minimum area.

Most reclaimed areas are used for farming purposes, such as citrus orchards, vegetable farms, and improved pastures. Land adja-



A fashionable residential subdivision south of Lakeland City has been built on reclaimed surface-mined land.



Giant lovegrass, originally planted on a half acre, has spread to cover 4 acres on a strip-mined area. John Hunt (right), land manager for the mining company, examines the tract with SCS Conservationists John Reed (left) and Melvin Broxson.

cent to cities has a high value for residential use and some is devoted to development. Other areas have been sold for youth camps, industrial sites, and highway rights-of-way.

One of the phosphate firms reclaimed and donated to the county a 740-acre tract now known as Sadle Creek Park, near Lakeland. It is equipped with nature trails, camping facilities, playgrounds, a marina, and facilities for various water activities. Prior to mining the area was an inaccessible swamp.

A 3,000-acre tract near Lakeland is to be developed for homesites. It is one of many tracts mined according to the plan which specifies leveling and filling at the time of mining.

Before conservation-minded leaders took steps to change Polk County's surface-mining operations, the ground was left scarred and pitted at the conclusion of mining operations—a public eyesore.

Today, the picture is changing, and instead of ugly scars, the land is being left in a leveled, usable condition—a community asset. ♦

City uses its many resources

A small city in north-central Tennessee found in the Hull-York Lakeland RC&D Project the means of preparing its own resource conservation and development plan and setting its course toward economic betterment.

Allardt, population 700, was incorporated in 1965. Its mayor, Oscar Gernt, was a local leader active in organizing the 11-county RC&D Project. Through him, the Allardt city council enlisted the help of the project organization and the Fentress County Soil Conservation District.

Experts from many agencies helped Allardt leaders study the community needs and its natural and human resources. More than 500 people participated in the study. Many committees specialized

on certain aspects of community life and combined their findings and conclusions into a resource conservation and development plan for the city.

Ten significant projects slated for early completion resulted: (1) A community center; (2) a recreation area; (3) control of unsightly, sediment producing, eroding roadbanks; (4) landscaping school grounds; (5) screening unsightly buildings; (6) beautifying the community park; (7) a sanitary landfill; (8) street improvement; (9) an adequate supply of domestic and industrial water; and (10) conservation plans for all farms in the Allardt vicinity.

"Perhaps we were a little skeptical of what we could accomplish," Mayor Gernt said. "The fact is we have been able to accomplish much more than we thought possible. One of our accomplishments is the community recreation facility."

Other accomplishments include the planting of flowering crabapple, bush honeysuckle, and hawthorne to beautify the school grounds and community parks, and 3,000 dogwood trees along the streets. The Home Demonstration Club planted flowers at street intersections.

"When the cleanup campaign began to bog down because the community did not have an adequate disposal area, the Soil Conservation Service helped select a site for a sanitary landfill.

"After we had our landfill in operation, people began picking up junk that had been lying around for years," Mayor Gernt said.

"We've made much progress in all phases of our resource conservation and development plan, and we're still working on it."—J. PAUL SIDWELL AND A. K. BOOHER, *district conservationist and RC&D project coordinator, SCS, Jamestown and Cookeville, Tenn.* ♦

Mayor Gernt checks one of the 3,000 dogwood trees planted along Allardt's streets, one of the city's many projects.





Flat channel terraces aid Nebraska farmers

By F. Eugene Liggett and Glen H. Buchta

District conservationist and area engineer, SCS, McCook, Nebr.

Flat channel terraces, a new approach to soil and water conservation in the Great Plains area of southwest Nebraska, adapt themselves effectively to modern farming methods by reducing operational costs, halting erosion, and helping to stabilize yields while accommodating today's multirow machinery.

Floyd Peters of McCook, Nebr., was one of the region's first farmers to recognize the benefits of the new terraces. He likes them because they are designed to hold 50-year frequency storms, whereas standard terraces are designed for 10-year storms. In addition, the 54-foot-wide channel area is leveled like irrigated land but not taxed like it.

Channel benefits

Peters prefers dryland farming to irrigation, now that he has the new terraces. A 220-acre field has nine terraces across it with 42 acres in channels—one-fifth of the field. He plants sixteen 40-inch rows of grain

Flat channel terraces are designed to hold 50-year frequency storms, whereas standard terraces are designed for 10-year storms.

sorghum in each channel, and every row is the same length. The channels catch and hold runoff from rain or snow, storing it for dry spells. Since building the terraces in 1965, Peters has averaged 70 to 80 bushels of grain sorghum an acre annually.

Cultivation practices

Between the terrace channels Peters grows wheat, which requires no special cultivation, and eliminates any need for parallel terracing. Seven or eight operations are needed to fallow the land and drill the crop, he says. In the terrace channels he gets a grain sorghum crop every year with three or four operations. Channel farming is easier since the land is level. Fallowing

is unnecessary there since the moisture is trapped by the terrace.

Terrace pioneers

Raymond Haag and his father, Leo, farm south of Bartley, Nebr. They too helped pioneer the use of flat-channel terraces among cooperators in the Red Willow Soil and Water Conservation District. Since 1963, they have built 28.5 miles of new-style terraces. The Haag's 1969 grain sorghum yield was more than 100 bushels an acre in the channels while the intervals between terraces contributed little to the total crop.

Peters and others in the area get even more benefits from flat channel terraces by building them to pick up water from road ditches at the edge of the field and channel it into cropland. Thus, they help reduce flood dangers, stop roadside erosion, and add moisture for the crops.

In 1965, the terraces cost 12 cents a linear foot to build. Now it costs 15 to 16 cents. Cost-sharing

Standing milo stubble in the channel protects field from wind erosion and catches snow in the winter.

Chiseling breaks up compacted layer of soil in flat terrace channel.

is available through the Agricultural Conservation Program or the Great Plains Conservation Program.

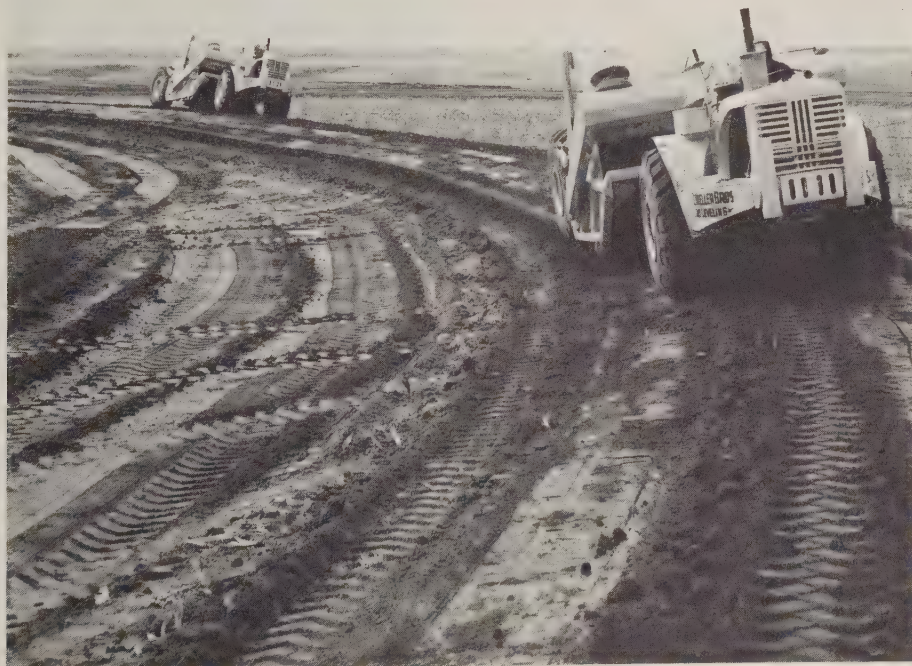
A temporary problem with flat-channel terracing is the compaction of the soil by heavy construction machinery. Chiseling, however, helps remedy the situation, as do natural factors such as freezing, thawing, and organic matter. Also, extensive earthmoving may affect soil fertility, but this can be offset by use of fertilizers. Heavy rains following planting may sometimes make replanting necessary.

From the overall standpoint of drought insurance, flood and erosion control, stabilized yields, and modern conservation requirements, however, Great Plains farmers are finding that the balance swings heavily in favor of flat channel terraces.



"It isn't how much money you handle, it's how much you have left at the end of the year that counts," says Floyd Peters. ♦

Earthmovers shape flat channel terraces in Red Willow County, Nebr.



Lining canal speeds water, reduces losses

Last May the Lyman Irrigation Canal in Arizona carried water to crops in a little less time than usual.

Water traveled the first mile in just 31 minutes, thanks to newly installed lining. The next 1-mile stretch took 4½ hours and only 40 percent of the water passed through. Negotiations are underway for lining the second of the 9 miles in the entire ditch.

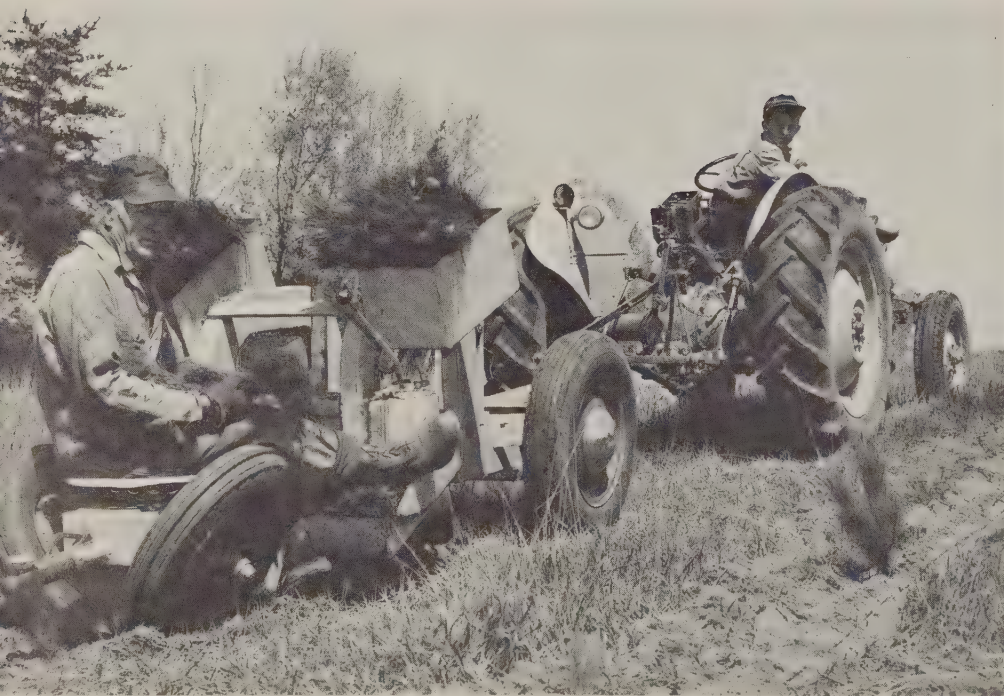
The possibility of saving so much water had appealed to others in the Apache Soil Conservation District who first saw "slipform" lining used on the Rancho Allegro farm in 1964.

The final plan developed with the aid of the Soil Conservation Service accounted for three cattle crossings, a watering outlet for buffalo in Lyman State Park, and corrugated metal pipes to route floodwater under the canal, in addition to the lining.—LYMAN A. HAVERFIELD, district conservationist, SCS, Springerville, Ariz. ♦



Giant stumps (top) are sad reminders of northern Michigan's great 19th century forest. Children (right) of a cooperator share the conservation experience.

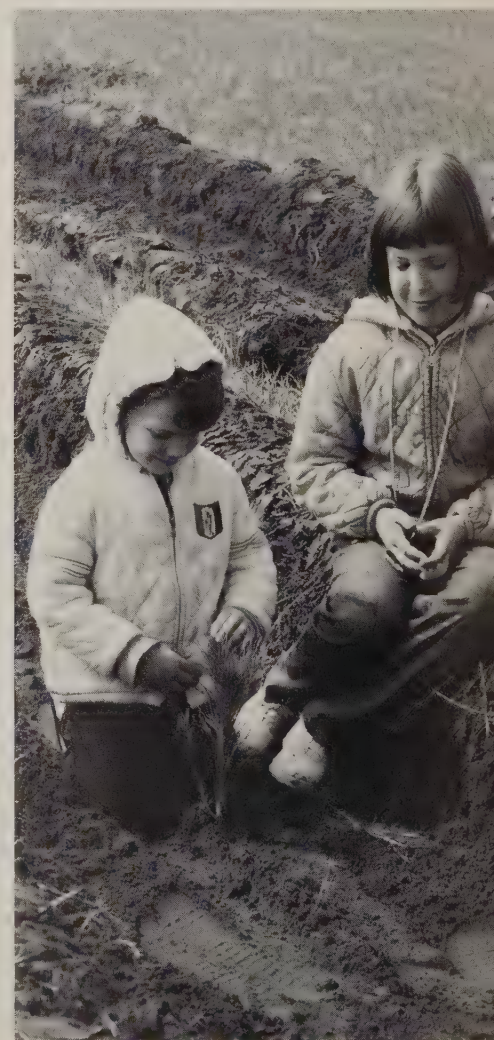
The conservation district provides equipment for planting trees.



By Clark A. Eacker
District conservationist, SCS, Ann Arbor, Mich.

The era of the vast red and white pine forests in Michigan is now history. Only the legends remain. Northern Michigan, however, is witnessing the return of these timber giants.

The Otsego Soil Conservation District, located in the northern portion of Michigan's lower peninsula, has long promoted tree planting on marginal cropland and cut-over timber areas. As a result, many landowners within the district are now reforesting this type of land



The timber giants return

for the purpose of timber production.

Trees have been planted on more than 11 square miles of Michigan's Otsego County during the past 25 years. Most of its more than 500 square miles was once covered by the legendary Old Growth. Four-fifths of the county is still considered as forest, and these plantings supplement the second growth areas which have grown up through the years.

According to Al Kassuba, Otsego District forestry chairman, "Many of our sandy northern soils are best suited to growing trees. Soil that is too light to produce potatoes or even hay and pasture will often do a good job of raising trees. Trees, like potatoes, are a crop."

Red pine continues to be the primary species used for reforestation. It has proved to be relatively free of disease problems and does well on sandy soils.

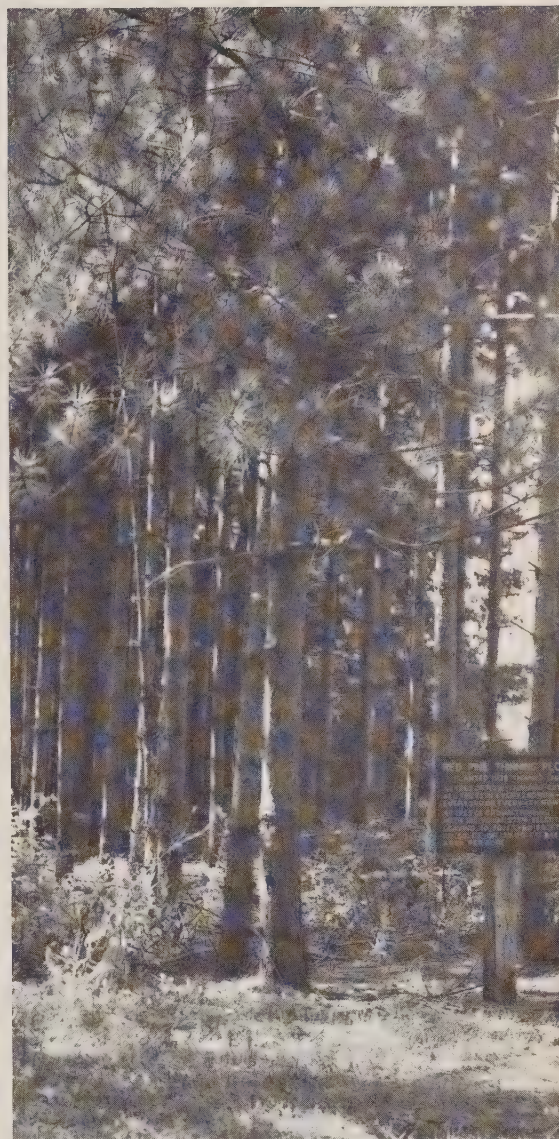
White pine is used in forest openings under existing hardwood cover. It will tolerate shade from other trees and can be planted where sunlight reaches the forest floor.

Each spring the Otsego District makes tree-planting service available to landowners. All the landowner has to do is decide where he wants the trees planted, and the district's tree planting team does the rest. Kassuba says, "This enables nonresident landowners who do not have the time or equipment to do the work to carry out a tree planting program."

Last spring the district planted more than 100,000 red and white pine seedlings. Many were planted on idle areas, and some used to convert marginal cropland to woodland.

Northern Michigan is witnessing the return of its legendary timber, and the majesty of the big pines again will grace the landscape. ♦

*A maturing red pine forest
nears time for harvest cutting.*



*Contour reforestation returns cutover and
idle land to productive use.*



Campus plant plots point way to careers

At 17 colleges and universities throughout the South, plots of grasses, legumes, and shrubs are doing a special show-and-know service in soil and water conservation.

They are helping to search out and test plants for conservation uses. At the same time they are giving students a chance to know and sound out career opportunities in conservation and related sciences.

The plots are performing their functions well. At Tennessee State University at Nashville, Dr. Fred Westbrook, Agronomy Department head, reports the plots there provide an outdoor laboratory where classroom teaching comes to life.

"Students show more interest in their work when they can see and touch the plants they are studying," Dr. Westbrook explained.

The plots are paying a doubled return in training highly qualified young employees for the Soil Conservation Service. Thirty-seven graduates of Tennessee State are working for SCS in 20 states as conservationists, engineers, and specialists. Others, not yet with degrees, are trainees.

The two most recent graduates of Tennessee State to join SCS are Bobby Pirtle and George McElrath, Jr., who got bachelor of science degrees in August. Like others there, they to a great degree developed interest in conservation work through experience with the plantings.

Similar results are reported from the other institutions.

Establishing outdoor laboratories in cooperation with agricultural col-

leges and universities was an outgrowth of a recommendation in 1966 by the Secretary of Agriculture's Public Advisory Committee on Soil and Water Conservation.

The committee suggested a limited number of geographic areas where the need for plant materials in conservation was not being met. On the committee at the time was Dr. David A. Hamilton, dean of Agriculture and Home Economics at Tennessee State. Dr. Hamilton was interested and began developing a plan for his institution to work in conjunction with the SCS Plant Materials Center serving the area.

In North Carolina, SCS State Conservationist J. P. Kuykendall talked over the possibility of a plot at North Carolina Agricultural and Technical State University at Greensboro with Dr. Burleigh C. Webb, dean of Agriculture. An agreement was signed by representatives of the university and the SCS.

Eighty-five species, strains, and varieties of plants went into the first plot at North Carolina A. and T. Fifty more were added in 1969.

Fifteen students from North Carolina A. and T. have entered the ranks of professional conservationists in the last 3 years.

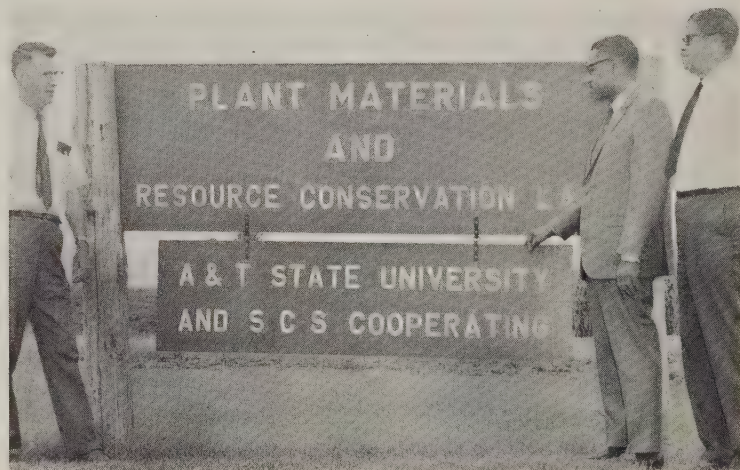
At Prairie View Agricultural and



At Tennessee State University a graduate student, Everett E. Holmes (right), works with SCS Agronomist Clarence Jent in evaluating plants for soil and water conservation.

Mechanical College in Texas, Professor Oliver Smith believes the educational value of the plot there matches the research value, although the latter was urgently needed in that section of Texas.

"We orient freshman agriculture students to the plots as a first step



At the marker of plant materials plots at North Carolina A. and T. University are (left to right), SCS District Conservationist Henry W. Robertson, President Lewis Dowdy, and Guilford County Extension Agent B. A. Hall.

in their education," he said. "We use the plots in teaching plant identification, planting and culture, adaptation and ecology, economics, erosion control, and wildlife management. Prairie View is strategically located for the study of plants in the coastal region. Our work is extremely helpful to the Soil Conservation Service."

Landowners farming near some of the schools have become interested in the work in the outdoor laboratories. Professional conservationists and land use planners are keeping in touch, too.

At Tennessee Technological University at Cookeville a stock of a new bermudagrass has been established and is used to sprig heavy traffic areas. And at Arkansas Agricultural, Mechanical, and Normal

College at Pine Bluff the football field has been carpeted with a new grass variety which now bears the name "Tufcote."

Other colleges active in the cooperative program are: Tuskegee Institute, Tuskegee, Ala.; Southern University and A. & M. College, Baton Rouge, La.; Alabama Agricultural and Mechanical College, Normal; Mississippi State University, State College; University of Puerto Rico, College of Agriculture, Mayaguez; South Carolina State College, Orangeburg; University of Tennessee, Knoxville; Texas Technological College, Lubbock; Delaware State College, Dover; Virginia State College, Petersburg; Lincoln University, Jefferson City, Mo.; and Fort Valley State College, Fort Valley, Ga. ♦

RC&D sponsors find new market for wild plums

By Donald M. McAndrew

Hydrologist, SCS, Reno, Nev.

Wild plums—nourishing fare even for prehistoric man—may give new economic sustenance to 20th century man in an unusual experiment that is part of the SCS-sponsored North Cal-Neva Resource Conservation and Development (RC&D) Project in two Western States.

Long before the white man came, Indians depended on the wild plums as a substantial source of food. Women harvested over-ripe plums and dried them in the sun. In 1832, Hudson Bay trappers discovered the delicious fruit while exploring the Pit River in Oregon.

The wild plum, or wild Indian cherry, is scientifically known as the Sierra plum (*Prunus subcordata*, var. *Oregana*). In the wild, it is a deciduous shrub, 4 to 8 feet high, growing in the valleys and

canyon bottoms of the Warner Mountains in northern California and Oregon.

Twenty years ago, some Goose Lake Valley residents selected the best wild plum trees available and propagated them for orchard production. New trees are formed by grafting the Sierra plum to a peach root. Grafted trees typically have crooked, rough, gray-brown branches and reach nearly 20 feet high when mature.

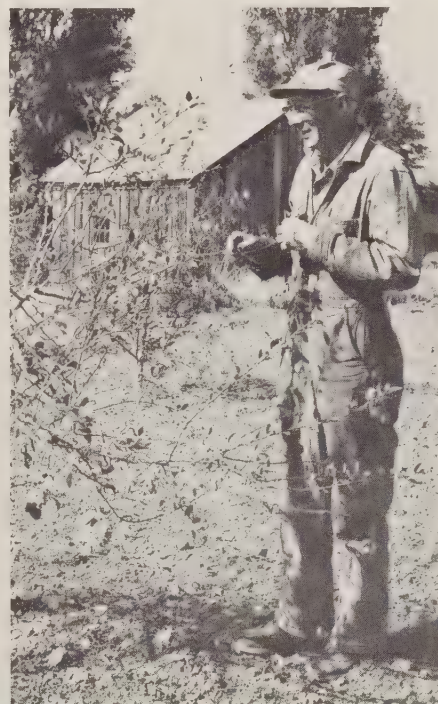
Jack and Virginia Hinton's 12-year-old wild plum enterprise near Pine Creek, Oreg., is an important measure in the success that RC&D sponsors hope will spread throughout the valley. She runs the Hinton Wild Plum Kitchens; he tends the trees and harvests the crops. More than 12,000 pounds of plums were harvested and proc-

essed in Hinton's Wild Plum Kitchens during 1968.

With the recently completed expansion of Hinton's processing plant, the owners estimate that they can process 80,000 pounds of wild plums annually. They plan to keep the processing plant running every day, and to increase substantially their own future plum production. Even so, to meet their capacity, other growers must produce much of the fruit in future processing. Fully operational, the new processing plant will require four permanent employees and 20 to 30 employees during harvest.

New Pine Creek, Oreg., located near Goose Lake Valley, serves as the center of the new commercial enterprise because of the excellent source of native wild plums grown in the surrounding mountains and cultivated orchards. The Soil Conservation Service assists in selecting and planning the preparation of suitable orchard sites. Other agencies formulate plans for the promotion and expansion of commercial markets for plum products. ♦

Jack Hinton's interest in wild plum trees is sparking new economic activity in the North Cal-Neva RC&D Project.



Greenbacks bring green back to gravel mines

New York

Mineowners in Port Washington, N.Y., have been putting money into banks that have given them tons of valuable sand and gravel.

Several years ago, erosion on steep slopes left by mining operations threatened some homes in the Nassau County town. Other residents were disenchanted with the image the unsightly banks presented to passersby. Owners of gravel mines along Hempstead Harbor were urged to revegetate the worked-out parts of the rich, local deposits.

The J. H. McCormick Company (one of the largest) contracted with Hans Weigert, a landscaper from Huntington, N. Y., to reestablish cover on mined areas. Weigert in turn initiated a cooperative venture with the Soil Conservation Service that has brought beauty and stability to some spots that were once eyesores.

Some new kinds of plants supplied by SCS Plant Material Center were planted for testing along with commercially available materials after Weigert did preliminary

work on the slopes. Cultural measures used to prepare the ground were: Grading to 1½ to 1 slope where possible; diverting water or installing closed conduits to carry it safely down slopes; spreading 6 inches of topsoil over areas to be planted; and fertilizing with 1,000 pounds of 10-10-10 per acre.

Shrubs and trees that provided the best cover were Cardinal autumn olive, bicolor lespedeza, and black locust. Weeping lovegrass and American beachgrass proved to be outstanding herbaceous materials. Coralberry, multiflora rose, larch, redstem dogwood, and tatarian honeysuckle were also planted.

Flatpea was the best new species used in the field trials. It is still being evaluated at the Cape May (N. J.) Plant Materials Center and is not yet available commercially.—ROBERT S. JONAS, *district conservationist, SCS, New City, N. Y.*, and W. CURTIS SHARP, *plant materials specialist, SCS, Cape May, N.J.*

Utah

Agencies help brothers improve sheep range

Two government agencies are helping a Utah sheep rancher get the most out of his spring-fall range in the northern end of Tintic Valley.

Each year, range conservationists from the Soil Conservation Service and the Bureau of Land

Management meet with Vern Wilson to evaluate conservation work on a tract that includes 5,094 acres of private land and 6,256 acres of federal land.

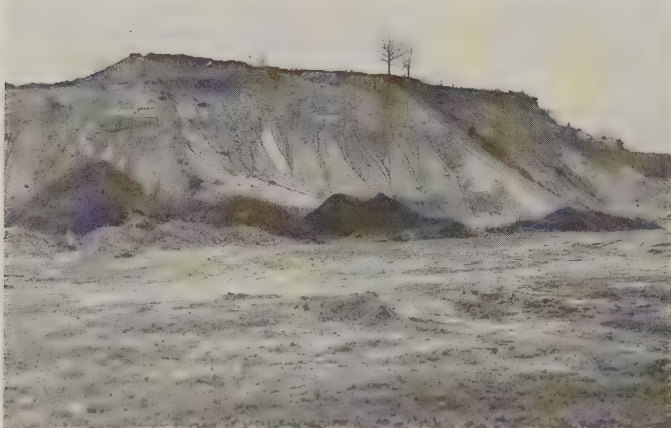
Cooperation began in 1964 after Wilson applied for assistance through the Juab Soil Conservation District. Plans call for a rotation-deferred grazing system and water supplies that allow each pasture to rest one spring in every 3 years. Seeding and chemical and mechanical brush control are also planned.

To date, Wilson has seeded about 650 acres of his land to crested wheatgrass and laid several miles of pipeline for livestock watering facilities. New fences make it easier for him to handle his Columbia-Rambouillet crossbreed ewes during lambing. BLM has done some seeding and fencing on acreage under its jurisdiction.

Wilson's brother, Emer, raises hay and grain on an additional 225 acres of irrigated land in Heber Valley. The farm is also a home off the range for 150 Suffolk bucks and any of the 3,500 ewes that need special attention.

These arrangements help the Wilsons make sheep ranching a paying proposition in spite of rising operating costs.—EARL SPENDLOVE, *district conservationist, SCS, Layton, Utah.*

Steep bank after gravel has been removed before and after stabilization.



Baseball and flood control —a California happening

Baseball and flood control go together at Santa Rosa, Calif., 60 miles north of San Francisco. There four Little League baseball diamonds lie in Brush Creek Reservoir, a flood-storage area that is dry in summer.

Normally, Brush Creek Reservoir would remain unused except after heavy winter storms. Urbanization in the surrounding area, however, presents the need for more recreation area, and leaders of the Rincon Valley Little League Association found a suitable baseball site in the dry flood-storage area.

Sonoma County Flood Control and Water Conservation District issued the group a free-use permit. Businesses, individuals, and groups donated time, money, and material estimated at \$80,000 for the recreation complex. During the summer of 1969, there were 8,000 recreation user-days on the dry lake bottom.

Recreation facilities—team dugouts, concessions, and restrooms of concrete block construction—are built to withstand winter flooding. Paved access roads and parking areas will have dust control. Sedimentation on the playing field is not a problem since land-treatment practices minimize erosion in the upper watershed.—SHERMAN J. FINCH, *district conservationist, SCS, Santa Rosa, Calif.*

Colorado

Big Sandy Project gives combination of benefits

Colorado's Big Sandy Creek Watershed Project in El Paso and Elbert counties presents a persuasive argument in support of recreation and flood-prevention measures as economical, compatible benefits of small watersheds.

During June 1965, three floodwater-retarding dams in the upper Big Sandy Creek saved the town of

Ramah's 400 residents and their property from extensive storm damage when 10 inches of rain fell on the area in 6 hours.

Recreation adds even greater benefits. Ever since Ramah reservoir was filled in 1963, the Colorado Game, Fish, and Parks Division has kept it stocked with fish for public use. About 50,000 people visit the recreational area annually. At \$1 a visitor-day, the annual recreational value at the Ramah reservoir exceeds the average annual cost of the entire project—13 floodwater-retarding dams and the Ramah multipurpose reservoir.

The multipurpose watershed project was sponsored by the Big Sandy Soil Conservation District and authorized for operations in 1965. Construction on the 198,484-acre project was completed in 1966 at a cost of \$1.8 million.—R. D. ANDERSON, *resource conservationist, SCS, Denver, Colo.* ♦

Illinois

Young people develop camp with elders' help

A youth-sponsored conservation camp near Taylorville, Ill., now replaces 55 acres of cropland and pasture. There youngsters can hike, play ball, picnic, fish, swim, canoe, boat, take pictures, camp, and identify trees.

The Taylorville Area Youth Council obtained a 60-year lease on the land from the city, and then solicited help from the Christian County Soil and Water Conservation District and other civic-minded groups to develop the Boyd Dappert Youth Reservation. The property, which is intended exclusively for youth, includes 1 mile of shoreline on Lake Taylorville.

The Christian County District agreed to assist the Youth Council in 1969. Since then, the Soil Conservation Service helped develop a conservation plan and provided technical services to the council.

District directors became members of several youth committees



Wilson brothers (Emer, left, and Vern) discuss their conservation plan.



Santa Rosa Little League team in action below dam.

Sixth graders at Dappert Youth Reservation.



and assisted in developing the youth area for conservation education, tours, camp-outs, and supervised tree-trail hikes. A recreation access road, parking area, restrooms, amphitheater, shelter, and a water well have been completed. Trees have been planted and transplanted; tree identification and hiking trails marked; recreation areas seeded; woodland pruned; picnic tables built; and an entrance sign erected.

Contributions to the youth camp come from individuals, service clubs, youth organizations, businesses, churches, and various government agencies. More than 100 individuals and a dozen organizations donated services.

Boy Scouts, Girl Scouts, public school students, 4-H clubs, F.F.A., church and Sunday school groups are currently using the area.—ROBERT CRAFT, *district conservationist, SCS, Taylorville, Ill.* ♦

On the lighter side . . .

Mystery grave causes a stir

One late overcast Friday afternoon, Dudley Griffin of the Bayou Chicot community in Evangeline Parish, La., was checking his livestock herd on the back forty of his farm when he stumbled onto a freshly dug unmarked "grave." When he returned home, he mentioned this to his wife and daugh-

ter. They decided to investigate further.

The next morning, the three went to the site. While looking around for clues, Dudley's daughter found an unsigned note tacked to a pine tree: "Dig site 40 steps northwest of this tree along this trail next to 'casket'." With chills running up and down their spines, they just knew that a body was buried in that freshly dug area.

The neighbors were called to verify the finding, and it was decided to let the sheriff's department handle it. A deputy was sent to the site. He checked the 3- by 6-foot freshly dug area and radioed for reinforcements with spades. A detail of trustees from the Parish jailhouse was rushed to the scene. By this time a crowd had gathered at the site.

At about 3 feet the diggers came across newspapers in the hole. One was a New York paper and the other a Louisiana paper. By then, everyone was convinced that a gangland type killing or maybe the victim of a bizarre love triangle was buried in the hole. Tension mounted, the ladies closed their eyes, cold sweat ran down the men's backs, the prisoners were reluctant to dig any farther for fear of what

they might find. But down they went, to the bottom of the pit. The grave was empty! The mystery remained.

Several newspapers reported the news along with pictures of the area. No one could solve the riddle. Did the killers become frightened and dump the body elsewhere? What, why, and who dug the hole in ground so hard that a pick had to be used?

By Monday morning, the excitement had reached a wide radius. People on street corners were talking about the empty "mystery grave." A newspaper was passed around in the Soil Conservation Service office at Ville Platte. The soil scientists read the article and noticed that the site in the picture looked familiar. It finally dawned on them what had happened. One of their soil sample sites had been "discovered."

The soil survey party leader went to "confess" to the sheriff and then went to see Griffin. When the farmer saw the SCS truck drive up, he, too, realized what had happened. The party leader had contacted him a month earlier for permission to dig a soil sample pit on his property, but he had forgotten about it. He did not realize, either, that a hole of "grave" dimensions would be necessary.

The note on the tree about the "casket?" Well, not only were the soil scientists to describe each horizon of the soil exposed in the pit, but a soil cast or monolith was to be taken for display purpose. Soil scientists sometimes refer to these casts as "caskets."

When the party leader changed his mind about the original site, he posted the note on the tree for the digging detail and left a soil monolith container (casket) for the profile he wanted dug. The newspapers, lunch bags, and other refuse were thrown into the pit and buried to prevent littering.—ARVILLE TOUCHET, *soil scientist, SCS, Lafayette, La.* ♦

Fieldmen studying soils dig pits large enough and deep enough to permit them to examine and describe the undisturbed profiles.



Review



Let's Grow! Community Benefits From Watershed Projects. 1970. USDA Agr. Inf. Bull. 337 16 pp., illus. \$0.40.

This booklet, illustrated in full color, tells about the new life that a watershed project can bring to a rural community.

The booklet gives concrete examples of some of these benefits: New jobs and millions of dollars in wages from the Brush Creek Watershed Project in West Virginia and the Mud River Project in Kentucky; more water for industry in Poteau River Project in Arkansas; adequate water supply for a new hospital in Virginia; fishing, boating, swimming, and picnicking in nearby watershed lakes throughout the country; new state and regional parks around watershed lakes in North Dakota, Pennsylvania, and Colorado; a protected flood plain in citrus orchards in California; water delivery to farmers and ranchers in Idaho; new farm-based industry in Mississippi; and quality vegetables for food processors in New York.

The examples are illustrative of the benefits, realized and anticipated, from nearly 1,000 projects approved to date under the Watershed Protection and Flood Prevention Act, of which about a fourth have been completed.

New publications

Man-Made Lakes: Planning and Development. EDITED BY KARL F. LAGLER. 1969. Food and Agriculture Organization of the United Nations, Rome, Italy. 71 pp., illus.—A guide for use in the earliest stages of planning manmade lakes or reservoirs. Emphasis on secondary aspects such as regional economic impact; effects of resettlement; environmental changes wrought by construction and flooding; changes in fish and wildlife habitat and management; opportunities for agricultural and industrial expansion; and undesirable side effects such as pollution, human social

stress, and the like. Although the photographs and examples imply that it was written for planners in developing countries, the booklet may interest those who seek further information on the international problem of multiple-use water-resource planning. Most of the guidelines have parallels in western methodology; but public health considerations rank higher in Asia and Africa because some tropical diseases and their host organisms thrive in environments created by new water bodies.

Effects of Surface Mining on the Fish and Wildlife Resources of the United States. BY WILLARD M. SPAULDING, JR., AND RONALD D. OGDEN. 1968. (1969). U.S.D.I., Bur. of Sport Fish. and Wildl. Resource Pub. 68. 51 pp., illus. \$0.60.—Following the release of an interagency report on how surface mining affects the total environment, Spaulding and Ogden consolidated the information on fish and wildlife habitat gathered by the Bureau of Sport Fisheries and Wildlife and prepared this publication.

Overall, 3.2 million acres of land had been surface mined in this country. Approximately 2 million acres of wildlife habitat has been damaged, including 1.6 million acres of land and the surface-water areas of 13,000 miles of streams, 281 natural lakes, and 168 reservoirs and impoundments.

The authors organized their information into two major sections: (1) the kinds of damage to fish and wildlife habitat, and (2) the reclamation efforts needed to restore the damaged environment.

Most of the conclusions have been set forth in the previous publication without the statistical detail presented here.

Managing Forested Watersheds, Cooperative Programs for Water Resource Conservation. 1969. USDA PA-919, 12 pp., illus. \$0.15.—Of the Nation's 489 million acres of commercial forest land, 358 million acres or 73 percent is in private ownership. Of this, 165 million acres (46 percent) is in farms, 131 million acres (36 percent) is in other private holdings, and 62 million acres (17 percent) is owned by forest industries. These forested lands produce more than 60 percent of the total water yield in the United States and play a vital role in maintenance of water quality. This publication describes Forest Service activities for the forestry phases of a watershed program carried out under the administrative responsibility of the Soil Conservation Service.

The Look of Our Land, an Airphoto Atlas of the Rural United States: The Far West. COMPILED BY SIMON BAKER AND HENRY W. DILL, JR. 1970.

USDA Agr. Hbk 372. 48 pp., illus. \$0.60.—The Economic Research Service has been conducting studies on present and potential uses of land in the United States. Two earlier publications, USDA Agricultural Handbook 153, *Land Use and Its Patterns in the United States*, published in 1959 and now out of print, and USDA Agriculture Handbook 296, *Land Resource Regions and Major Land Resource Areas of the United States*, compiled by the Soil Conservation Service and published in 1965, presented information on United States resource regions. This atlas brings together text from the latter book matched to photos of samples of three areas in the far West. Each sample is shown by an index mosaic of the area on the left-hand page faced by a stereoptic pair of photos on the right.

Windbreaks for Conservation. BY ARTHUR E. FERBER. 1969. USDA Agr. Inf. Bull. 339. 30 pp., illus.—Windbreaks in fields are most needed where wind erosion is a problem in parts of the vast Great Plains; on the sandy and muck soils in the Great Lakes region; on sandy soils along the Atlantic and Gulf seaboard; and in the irrigated valleys of the Pacific southwest and the Rio Grande, Colorado, and Columbia River basins. They are not only being used in the North and West but are useful in almost every state—even in the Deep South. And they are just as valuable to the country homeowner as to the farmer.

This bulletin, superseding Miscellaneous Publication 759, *Windbreaks in Conservation Farming*, gives the latest information on windbreaks. It also presents a "wind-chill index" table based on a study by U. S. Army research teams of the chilling effect of wind on the human skin.

Private Outdoor Recreation Enterprises in Rural Appalachia. BY HUGH A. JOHNSON, JUDITH M. HUFF, AND J. J. CSORBA. 1969. USDA, Economic Research Service ERS-429. 18 pp.—Study undertaken to determine to what extent recreation enterprises operating in rural Appalachia can help meet the growing urban demands for outdoor recreation and provide profitable use of rural resources and employment for rural people. These findings are the result of analyzing 86 recreation operations studies drawn from a nationwide survey conducted by the National Association of Conservation Districts cooperating with the Soil Conservation Service.

Effects of Conservation Practices on Storm Runoff in the Texas Blackland Prairie. BY R. W. BAIRD, G. W. RICHARDSON, AND W. G. KNISEL, JR. 1970. USDA Tech. Bull. 1406. 31

pp., illus. \$0.20.—Objective of this study was to determine the effect of various conservation practices on amounts of storm runoff by studying treated and untreated watersheds in the Texas Blackland Prairie and then developing equations to predict runoff resulting from either of the two conditions on a given watershed. This publication gives the results.

Estimated Use of Water in the United States, 1965. BY C. RICHARD MURRAY. 1968. U. S. Geological Survey Cir. 556. 53 pp., illus.—The most recent updating of estimates prepared every 5 years by the U. S. Geological Survey of water use, quantities of water withdrawn from surface and ground-water sources, and average annual streamflow in the United States. Tabulations are provided by states and by water-use regions. Total withdrawals increased about 15 percent, from 278 to 310 billion gallons a day, from 1960 to 1965. The quantity of water consumed increased 28 percent in the same period.

What Can You do to Benefit Wildlife on Your Land? 1969. Tennessee Valley Authority, Norris, and Tennessee Game and Fish Commission, Nashville. 16 pp., illus.—Includes basic information about wildlife in general and seven species in particular: white-tailed deer, ruffed grouse, raccoon, gray squirrel, bobwhite quail, cottontail rabbit, and mourning dove. Suggests inexpensive improvement practices that may be scaled to individual interest and capacity.

Techniques for Wetland Management. 1969. Wisconsin Department of Natural Resources, Madison. Research Rpt. 45. 156 pp., illus. Free on request.—A report summarizing the practical experience of Wisconsin wildlife biologists in developing and managing wetland areas for aquatic game species. Covers constructing impoundments; manipulating water levels; managing vegetation mechanically, chemically, and through prescribed burning.

Climates of the World. 1969. U.S. Dept. Com., Environmental Science Serv. Admin. 28 pp., illus. \$0.35.—Updates similar data which appeared in "Climate and Man," the 1941 Yearbook of Agriculture and discusses briefly the principal feature of climates of all the continents. Maps of worldwide temperatures and precipitation and tables of monthly and extreme annual temperatures and precipitation, for about 800 stations.

Recreation Site Evaluation. 1968. Bureau of Recreation, Wisconsin. (48)

pp., illus.—Helps the developer make decisions in his evaluation of recreation lands; presents the need for preplanning and determining the main purpose of planned developments; and gives guide to site selection.

Guide for Area Overall Economic Development Programs. Rev. 1969. U. S. Dept. of Commerce, Economic Development Administration. 24 pp. \$0.35.—Guide to area leaders in preparing and submitting their OEDP and in updating it annually as part of a continuing development program.

A Primer on Waste Water Treatment. 1969. U. S. Department of Interior, Federal Water Pollution Control Administration CWA-12. 24 pp., illus. \$0.55.—In color, explains the methods used now and processes being developed for the future to treat wastes.

Handbook of Agricultural Charts 1969. 1969. USDA Agr. Hbk. 373. 146 pp., illus. \$0.65.—The annual catalog of charts available from the Department of Agriculture as photo prints or slides.

Managing Public Rangelands. BY RICHARD S. DRISCOLL. 1969 (slightly revised). USDA AIB-315. 30 pp., illus. \$0.25—Effective livestock grazing practices and systems for National Forests and National Grasslands.

Engineers in the Soil Conservation Service. Rev. 1969. USDA Misc. Publ. 956. (20 pp.) illus.—Career opportunities in SCS.

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Meetings . . .

Planners to discuss urban environment

The American Society of Planning Officials will meet in New York, April 4-8. Some of the major topics to be discussed are: New York's first comprehensive plan, minorities in the planning profession, neighborhood-initiated plans, what planning with people means in the inner city, the mature suburb and relevancy, effects of physical environment on human behavior, and national policies on urbanization and land use.

Short course sessions will be held on land use policies, environmental protection devices, analytical techniques, and housing and the planner.

The Honorable Shirley Chisholm, U. S. Congresswoman from New York, will give the keynote address.

Dates and places

April 1-3, Engineering Geology and Soils Engineering, annual symposium, Pocatello, Idaho.

4-8, American Society of Planning Officials, New York, New York

12-15, Institute of Environmental Sciences, Boston, Mass.

19-23, Urban Land Institute, Honolulu, Hawaii

28-29, Weeping Lovegrass Symposium, Ardmore, Okla.

May

3-6, Soil Stewardship Week

4-7, National Forests Products Association, Washington, D.C.

4-8, League of Women Voters of the U.S., Washington, D.C.

6-8, Forest Farmers Association sponsoring Southern Forestry Conference, Mobile, Ala.

10-15, International Science Fair, Baltimore, Md.

15-19, National Audubon Society, Seattle, Wash.

17-21, National Council of State Garden Clubs, Inc., Chicago, Ill.

11-14, The Garden Club of America, Boston, Mass. ♦

Small farmer still around

The day of the 40-acre farmer and a mule is about gone, but the 40-acre farmer and a tractor are still around. Ezell Ealy who farms south of Monroe, La., is one of these farmers.

Ealy owns 40 acres and leases 30 acres. He grows 30 acres of cotton, 8 acres of soybeans, and about 6 acres of truck crops. Five cows graze the rest of the land.

Ealy has been farming all his life, but most of the time he was working for someone else. For several years he worked part time in Monroe and farmed on the side.

"I think the farm is a good place to bring up kids," Ealy explained. "It gives them something to do."

In 1962 Ealy quit his job and started to farm full time.

"I haven't regretted it," he said.

Ealy admits he has had problems such as too-wet soil and low fertility. Then there was the problem of financing for his small farming operation. He has these problems solved now.

He signed up as a cooperator with the Boeuf River Soil and Water Conservation District and asked for help on conservation work. The Soil Conservation Service helped as he developed a plan and surveyed and designed ditches for better water management. He applied to the Agricultural Stabilization and Conservation Service for cost-share assistance to build the ditches, to buy lime, and to put in winter cover crops to build up his soil. The Farmers Home Administration lent him money to buy equipment, supplies, and material to put in crops and to do other improvements.

Ealy said that with financial and technical help his farm is paying off by producing enough income to support his family of six.

Last year's cotton yield was one bale to the acre. His soybeans made 25 bushels an acre.

The truck crop brings in early year cash.

"We use a lot of vegetables ourselves," Ealy said. The five cows are milked for family use.

Ealy plans to stay on the farm as long as he is able to make a crop. His four children help him do much of the farmwork. He looks upon this as a worthwhile contribution to the family income. And look where you will, you can't beat life on a family farm—at least on the kind of farm he has. ♦

Land smoothing improves corn silage yields

Experimental land smoothing and surface drainage improvement in New York State resulted in average corn silage yields above those of fields with similar or superior natural drainage, according to Cornell University scientists.

Many of the 127 test acres were once too wet for crops.

Farmers using the technique realized a return of \$4 for every dollar invested at the original rate of \$30 an acre for smoothing and installation, scientists reported.

The demonstration project was run by the Cornell University Agricultural Experiment Station with assistance from the Soil Conservation Service, Agricultural Stabilization and Conservation Service, soil conservation districts, and county extension offices. Results were reported at the 1969 meeting of the American Society of Agronomy in Detroit, Mich. ♦

Erosion follows fires

Water-repellent soils are a problem in the steep, unstable foothills that lie above highly populated areas in southern California brushland watersheds. The high erosion rate is due, in part, to a water-repellent layer formed during brush fires that are all too common during long dry seasons. Although downstream flood damage has been reduced by dams and reservoirs built in canyons above communities, repeated erosion makes maintenance of their storage capacity a costly process.

Earthworms studied for use in strip-mine reclamation

Earthworm inoculation may some day be added to standard procedures for strip-mine reclamation already developed to cover spoil banks with new vegetation.

Earthworm populations established on heaps of clay shale in northeast Ohio buried leaf litter beneath black locust trees during a 180-day experiment. Plant nutrient concentrations in the spoil banks increased significantly as earthworm activities hastened leaf decay and organic matter incorporation.

Field results were confirmed by Dr. J. P. Vimmerstedt, a research forester who conducted simultaneous greenhouse studies of spoil material cores at the Ohio Agricultural Research and Development Center in Wooster, Ohio.

In a paper presented at the 1969 joint meetings of the American Society of Agronomy, the Crop Science Society of America and the Soil Science Society of America, Vimmerstedt reported that earthworms confined to specific spoil-bank areas for 2 years buried or consumed about 2.2 tons per acre of litter and 10 tons per acre of unmixed surface organic matter. ♦

USDA to aid Black Hills RC&D Project

The Black Hills Resource Conservation and Development Project in South Dakota and Wyoming has been authorized for accelerated financial and technical aid.

More than 200 Black Hills RC&D Project proposals were developed by local people.

The project area covers Butte, Meade, Lawrence, Pennington, Custer, and Fall River counties in western South Dakota and Crook, Weston, and Niobrara counties in adjoining Wyoming.

The sponsors are 14 soil and water conservation districts, one subconservancy district, and nine boards of county commissioners.

The Black Hills RC&D Project is the 55th to qualify for operations assistance from USDA agencies. ♦

Recon . . .

A quick overview of the conservation scene

Representatives of two competing land uses in California have agreed on the future of the Pleasanton Plant Materials Center. SCS will use funds from its sale to Alameda County, authorized by an act of Congress in September 1967, to buy and develop a new site. In a few years, the present center's conversion from nurseries and test plots to fairgrounds will be complete.

Landfill—sanitary?

"While industry designs sophisticated salvaging equipment, municipal officials lag far behind in adapting to changes in the character and quantity of solid wastes. Seventy-five percent of municipal solid wastes are still disposed of in open dumps and more or less compacted by bulldozers. According to the Public Health Service, less than 10 percent of these sites qualify as sanitary landfill."—JOHN H. ABRAHAM, manager of environmental pollution control programs for the Glass Container Manufacturers Institute, Inc., in a talk to Washington Chapter of the Soil Conservation Society of America.

Professors at the University of Michigan (Ann Arbor) are trying to develop computerized learning games for use in a course in natural resource management. With the help of a National Science Foundation grant, James T. McFadden and his associates hope to create and program a series of simulated animal populations and

environments. Student teams will base decisions on typical information, but, unlike real managers, they will learn long-term results in minutes. Complex versions of the increasingly difficult games will also include economic, political, and sociological factors.

The drive for erosion and sedimentation control goes on in Maryland where pioneer ordinances were passed in 1965. This year citizens and local officials in Anne Arundel County hope to add their erosion and grading control ordinance to the list started by Montgomery and Prince Georges counties.

It all adds up

"When we talk to individuals and corporations, we are left with the impression that they view their little bit of pollution as the exception; it is so small that it can't have any significant impact on the total environmental problem . . . We forget that our national problems are the aggregation of all of the small things . . . the several bits of paper add up to be an immense problem in environmental degradation . . . the single beer cans amount to a highway cleaning job that costs the taxpayers of Louisiana \$2 million every year. We gripe about the high cost of government and yet here is a very direct way in which we can begin to cut the cost of government services."—GERALD J. McLINDON, dean of the School of Environmental Design, Louisiana State University, Baton Rouge, La., to the Louisiana district supervisors, January 5, 1970.

In Michigan, sediment control is on its way from voluntary programs to written regulations that can be enforced. The Washtenaw County Metropolitan Planning Commission is reviewing provisions included in a model subdivision control ordinance. In addition, the city of Ann Arbor is reviewing its own proposed soil erosion and sediment control ordinance.

Predictions by J. Millard Tawes, Maryland's Secretary of Natural Resources:

Soil conservation will become a cost of doing business for every land development and land use in Maryland during the next decade . . . Acid mine waters that poison streams and rivers will be well on the way to extinction by 1980 . . . The geologist will join with the biologist in efforts to determine the best uses for the state's more than 300,000 acres of wet lands which are vital to the ecology of marine life.

Waste recycling methods may someday make conventional sewage disposal systems obsolete. Citizens of Muskegon County, Mich., are refining ways to "loop the system" with the help of matching funds from the Federal Water Pollution Control Administration. Their recycling program designed for urban areas incorporates sewage pipelines to outlying settling lagoons and spray irrigation of pastures that grow food for livestock and thus for people. By dealing with wastes as a nutrient source rather than a nuisance, planners envision a 69 percent return on initial investment.

Several states in the Northeast and far West have responded to the pressures of urbanization by assessing their supply of prime agricultural land. Results of one of the most recent studies were published by Pennsylvania this January. In addition to taking stock of the quantity and quality of the state's remaining farmland, the Governor's Committee for the Preservation of Agricultural Land made recommendations for its "systematic and orderly preservation." SCS provided basic data for delineating areas of potentially productive land in the Keystone State.



Districts and the new Everybodies

Whose world is it?

Everybody's, of course.

Whose responsibility? Everybody's.

And all of a sudden, a lot of Everybodies are interested in the environment.

They look around at degraded landscapes and polluted rivers. They watch orchards turn into unplanned slurbs, and they wrinkle their noses at "garbage can" air. When they can, they escape into the countryside.

Many of the Everybodies think that the land "out there" stays productive and beautiful all by itself. Some of them remember those years when the countryside, too, was ravaged; when streams were "too thick to drink and too thin to plow;" and, in the Dust Bowl area, the air was often filled with choking, blinding dirt. And remembering, they may realize that almost behind their backs, conservation **has** been steadily going on.

Who are the new "Everybodies"—the people among whom concern for conservation, ecology, and the environment is growing?

A few of them wring their hands and cry a lot. A few more slam around and stop there. But most of them are seriously concerned men and women who are willing to get involved. The problem is, they don't know where to turn; what doors to knock on, what phones to ring, what conservation programs are available to work in.

Many of the newly aroused are young people—students, housewives, young workers. Listen to a few of their remarks about conservation and the environment from a recent issue of the magazine, **Cry California:**

"People are afraid, very afraid."

"When I was little, the water was clean and we could go swimming. But . . . I've seen the pollution grow and destroy. So this week I'm switching from an art major to biology. I want to be able to do something."

"I'm aware that we've got problems, but I'm stymied and don't know what to do about them."

And, over and over, the interviewer heard variations of this thought.

"I'd stand behind anyone who had a good plan. I really would."

Conservation districts have had a positive action program to improve the environment for years. A once-scarred, now-beautiful countryside is their monument.

Conservation district supervisors have held the line in many areas when the conservation idea was out of sight, out of fashion, and almost out of funds. They've worked hard and effectively. But five men in a community, no matter how hard-working, cannot meet the widened conservation demands of today. They deserve more help.

Isn't there a tremendous opportunity to match the people who want to be actively involved with the districts which seek help? Aren't there conservation jobs in every district to challenge the energy and thinking of businessmen, bus drivers, housewives, retirees, and young people? Can't we, particularly, work to enlist the talents of the young?

Working with young people is a two-way street. Are they impatient? Perhaps. Inexperienced? Sometimes. Necessary? Absolutely.

District supervisors and professional conservationists can show them the "why" of patience when working with Nature. We can help change inexperience into knowledge. We can benefit from their energy and idealism. And, we can listen to them; to their ideas, their feelings, their hopes for the future. It's their world, too—and for longer than it is yours or mine.

The essence of conservation is renewal. Conservation movements, too, need the renewal that comes from new people and infusions of fresh energy. Conservation districts have a vitally important job to do, and there are people willing to help. Let's help get the two groups together.

Kenneth E. Grant



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Woodland contest yields a double prize

A Youth Forestry Contest in the Poteau River Soil and Water Conservation District in Arkansas netted the winner, Nelton Henley of Waldron, not only a \$75 Government bond as a prize but a \$200 profit on his project.

Participants were required to select a woods, or part of a woods, 2 to 5 acres in size, write an objective forestry plan, and improve the woods as set forth in the plan.

Each plot was scored after the work was completed by a panel of professional foresters representing the Agricultural Extension Service, Arkansas Forestry Commission, and the Soil Conservation Service.

Henley, a senior vocational agriculture student, used 2 acres of his father's woods as his project. He fenced the plot and protected it from fire and grazing; deadened cull trees; marked the woods for a selective cut; cut the trees himself and converted them into marketable products; and hauled them to the mill and sold them.

The best trees remain, the woods were not overcut, and the value of

products left standing is estimated at \$468.

Best yet, in 5 to 6 years young Henley can make another profitable

cut, and from this experience he knows how to do it.—MAX D. BOLAR, forester, SCS, Little Rock, Ark. ♦



Contest winner, Nelton Henley, marked and cut his trees and marketed the products.

Soil Conservation

Devoted to the wise use of land and water resources

Conservation by nonfarm land users
Examples from many states



Soil Conservation

Devoted to the wise use of land and water resources

Vol. 35 No. 10 May 1970

Land users . . .

Everybody is a land user.

The suburban householder tending his garden; the rural resident commuting to a job in town; the public school or hospital improving its grounds—all are using their share of the land as space and consuming their share of its products.

Every citizen thereby shares in creating the kind of environment in which we all live. Happily, many urban and suburban people, individually and through their local governments, are assuming responsibility for the way they use land and water resources.

This issue of **Soil Conservation** presents a collection of examples of nonfarm conservation activities contributed by SCS fieldmen.

Community action: One way communities deal with community problems is through their local governments.

Gwinnett County, Ga., hopes to forestall future flood damage by marking the boundaries of flood plains and restricting building within the flood-hazard district (p. 219).

New Hampshire has a law requiring soil information as a basis for permitting sewage-disposal systems near surface waters (p. 221).

SCS technical information is being used in administering these regulatory measures, as in many similar instances.

. . . and facilities: Schools, churches, and other institutions, like individuals, have soil and water problems on their properties.

We have accounts this month of how SCS is helping a convent in Wisconsin (p. 222), a public housing project in West Virginia (p. 225), and a school system in Missouri with such problems.

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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An answer to flooding on urbanizing watersheds . . .

A flood-hazard district with boundaries physically marked on the ground is one answer the people of Gwinnett County, Ga., are posing to the threat of increased flooding caused by advancing urbanization.

A million-dollar flood in 1963 on famous Peachtree Creek in Atlanta alerted citizens of surrounding areas to the destructive potential of streams hemmed in by buildings and paving.

Following the flood, property owners along Peachtree Creek arranged through the Atlanta Soil and Water Conservation District for a study of their problem by the Soil Conservation Service under provisions of Public Law 566.

An on-the-ground survey of the watershed revealed that urban development had advanced so far that installation of floodwater-retarding structures would not be feasible. Without the structures, elimination of flooding by channel improvement also would be impractical. The study concluded that there was little hope for alleviating flooding on this urbanized watershed. The hydrologic analysis indicated that recurrence of floods similar to the

one in 1963 might be expected on the average once in 3 or 4 years and that larger floods would undoubtedly occur from time to time.

The SCS analysis of Peachtree Creek's problems moved the commissioners of Gwinnett County, on the outskirts of Atlanta, to look at their own prospects for the future.

Through the Upper Ocmulgee River Soil and Water Conservation District they obtained technical guidance from the Soil Conservation Service. They also employed a planning consultant to prepare recommendations for updating the county's zoning regulations.

The resulting plan creates a flood-hazard district including land subject to periodic flooding. It limits land use within the district in ways to avoid damage to persons and property and to preserve the capacity of channels and flood plains to carry runoff waters. A referendum in the county approved the regulations and made necessary changes in the zoning ordinances.

The flood-hazard district regulation permits agricultural use of flood plains and provides for other uses with specified safeguards. Pub-

A flood hazard district

By Earl Jenkins

Area engineer, SCS, Decatur, Ga.

Apartments built on fill on a flood plain constrict the natural watercourse and thereby increase the hazard of flooding.



An RC&D Project crew checks elevation of a boundary marker for the flood-hazard district.

lic utilities, outdoor advertising signs, roads, parking areas, and recreation facilities are allowed provided they are adequately designed and will not obstruct natural water-flow. Dams must be constructed in accordance with specifications of the Soil Conservation Service or the U.S. Army Corps of Engineers.

Meantime, plans had been developed for a project measure in the Gwinnett County Resource Conservation and Development Project to determine and mark the flood-hazard boundaries on the land. Fortunately, one of the primary streams in the county, Suwanee Creek, had been planned as a watershed project under Public Law 566. With little additional survey information, the 100-year flood line for this stream was established for Suwanee Creek. Soil Conservation Service engineers assisted the Gwinnett County Engineering Department in setting markers at all major road crossings. Permanent concrete posts with stamped bronze plates on top



clearly show the elevation of the 100-year frequency high waterline.

The Soil Conservation Service is now working on a map of the limits of flood hazard for the rest of the

streams in the county. The U.S. Army Corps of Engineers has flood-plain information reports for some of the major streams in the county. Other streams have been planned under the Watershed Protection and Flood Prevention Act. This information, supplemented by the recently published soil survey of Gwinnett County, will be the basis of a zoning map of all the flood-plain lands in the county.

When all the markers are in place, any prospective builder can easily determine which sites are within the boundaries of the flood-hazard district and subject to restrictions on development that might aggravate future flood damages. ♦



Urbanization of the watershed increases the flood hazard to fashionable homes along Peachtree Creek.



Shorelines Law guards surface water quality

By Sidney A. L. Pilgrim

State soil scientist, SCS, Durham, N.H.

A law regulating sewage-disposal systems near shorelines, enacted by the 1967 session of the New Hampshire Legislature, puts soil survey data to use in safeguarding the quality of surface waters in the state.

The law requires applicants to give soil survey information along with results of other onsite investigations as a basis for permission to install new septic tanks or other disposal systems near shorelines of the state's many lakes and streams.

During the past 3 years, SCS offices in the state's 10 counties have answered more than 6,000 requests for soil survey data. Approximately 85 percent were for individual building lots. Subdivision development accounted for the remainder. Information was provided to individual landowners, developers, private engineering firms, contractors, and others.

Prior to the Shorelines Law, surface water in many parts of the state was being polluted by drainage from cesspools and dry wells and by direct discharges of domestic wastes. Now disposal-system plans must be reviewed by the State Water Supply and Pollution Control

Commission before they are installed.

"Our staff technicians make intensive use of soil data as they review applications," says Russ Eckloff, associate sanitary engineer for the commission. "Soil properties, such as depth to seasonal water table, depth to underlying hardpan layers, and permeability rate, are carefully cross-checked with the design. Plans that do not adequately account for soil limitations are returned for modification."

Modern soil surveys have been completed for four of the 10 counties. In these, requests can be han-

dled by local SCS offices without additional assistance from soil scientists. In three of the four surveyed counties, landowners may obtain necessary information directly from published surveys.

Information in the other six counties is obtained in the course of routine survey operations. Three of them are in a progressive mapping status.

District conservationists report that more requests for other types of technical assistance from SCS come in the wake of the initial contact required by the Shorelines Law. ♦



Lake Winnepesaukee's multiple shorelines invite recreationists and associated pollution.

Dark puddle of effluent from sewage system in shallow soil would be avoided by proper site selection.



Foaming waves rip soil from a Lake Michigan shoreline slope.

A plan to still the waves on lakeside beach

By Paul A. Johnson

Area engineer, SCS, Waukesha, Wis.

On a clear day you can see forever . . . muddy water.

Seeing the threat of beach erosion to their convent site on the shore of Lake Michigan, the Sisters of St. Dominic in Racine County moved the location of their planned buildings 275 feet inland and installed erosion-control measures planned with the aid of the Soil Conservation Service.

Their 900 feet of treated shoreline is only a fragment of 200 miles on Lake Michigan in Wisconsin that shares similar problems. At some locations the shoreline is receding at the rate of 6 feet a year. The U.S. Army Corps of Engineers estimates that more than 100,000

The St. Dominic Convent's lake front is protected by rock groins and riprap and a grassed slope.



cubic yards of sand migrates across the stateline from Wisconsin to Illinois every year.

The Racine County Soil and Water Conservation District board of supervisors agreed to make assistance available to the religious order when Sister Joseph Ellen, treasurer general, laid the problem before them in 1966. SCS conservationists and engineers helped the owners prepare a conservation plan for the site of the proposed \$5-million convent and chapel complex.

Following the plan, the sisters had quarry stone riprap placed at the toe of the slope to dissipate the energy of the waves. Nine stone groins perpendicular to the shore now trap littoral drift and are building up a sand beach. The groins average 70 feet in length and are spaced about 100 feet apart. In 3 years, they have trapped and retained enough sand to cover the riprap and most of the groins.

The upper slope presented an entirely different problem. There surface water had cut gullies deep enough to bury a truck, and underground seepage had caused earth slides. The grounds terminated in an almost vertical bluff 35 feet high, a severe safety hazard as well as a threat to buildings.

Bulldozers and draglines were put to work on the bluff, and the slope was cut to a stable angle of three to one. A perforated subdrain installed below the zone of seepage across the entire slope eliminated ground water.

Surface water was redirected away from the slope by diversions, then channeled into catch basins and released through pipe conduits. This required major regrading of 6 acres of land between the buildings and slope. After the topsoil had been replaced, the steep slopes were sodded and the flatter areas seeded with Kentucky bluegrass.

The Sisters of St. Dominic are now putting the finishing touches on their convent with confidence that on a clear day they can see clear water on their beach. ♦

Satellite conservation problems . . .

Tourism and recreation give new turn to planning resource use

By John A. Walker

Area conservationist, SCS, Knoxville, Tenn.

The mobile American, constantly searching for a plot of ground in Countryside, U.S.A., is placing increasing demands on soil conservation districts for advice and consultive assistance.

This demand for rural nonfarm help is growing everywhere, but in Sevier County in the shadows of east Tennessee's Smoky Mountains, it has created a challenge to the Sevier Soil Conservation District.

Six million tourists come through Sevier County annually. Many who come to visit the scenic mountains return to buy a little of the scenery to call their own. County income from tourism is about \$70 million a year, 10 times that from farming.

The development of rural land

for recreation or tourism creates "satellite" problems of conservation.

William C. Boruff, Soil Conservation Service district conservationist, estimates that he and his staff spend more than half their time helping people develop natural resources for tourist recreation businesses or for their own enjoyment.

Resources for enjoyment

"We have been called on to help plan conservation measures on campsites, stabilize roadbanks, evaluate soil for septic tanks, and select sites for all sorts of recreational development," Boruff said.

The Henry Price story is typical. Price, of Washington, D.C., bought 75 acres of scenic land on Upper

Mountain streams and woods entice urbanites to the countryside.





A trout farm with "fish-out" lake is part of a rural recreation development.

Middle Creek in 1959. In helping Price carry out his conservation plan as a cooperator with the conservation district, Boruff provided such unconventional technical services as helping select land for a log cabin, stabilizing a new road, and building a lake for scenic value and fishing. "Regular" conservation practices, such as reforestation of idle areas, have been applied with district and SCS assistance.

Old cabins and a barn

Another very unregular district cooperator is W. A. Bell, a retired county agricultural agent. Bell bought a farm near Gatlinburg on one of the main tourist routes. The farm had two old log cabins and a barn. Bell turned the old barn into a hotel, built a lake and started a trout fishing operation, and began cashing in on the recreation market.

He had problems of land use, drainage, and lake site selection that brought him to the district office.

Reelie L. Maples, an experienced motel owner and banker of Gatlinburg, is developing a 100-acre tract of mountain scenery near the entrance to the Great Smoky Mountains National Park. Here, road construction created the problem of stabilizing the roadbanks. Plants

had to be selected and plans made for seeding, mulching, and managing the cuts.

Two lakes built

Two lakes were surveyed and built. Scenic values were considered along with regular technical details of construction and revegetation. Maples wanted wildlife, so the selection and establishment of the right food and cover plants had to be considered.

"Benefits from these privately developed enterprises do not stop at district boundaries," says B. M. Trundle, chairman of the Sevier Soil Conservation District board of supervisors. "People from several counties around commute to jobs at these hotels, motels, riding stables, and fish-out lakes. Modernizing the district program to include assistance with the resource aspects of these developments places the district board in a place of great responsibility in the economic growth of the county."

In addition to the farm and rural nonfarm workload, the district is helping town leaders develop the industrial potential of Sevierville, the county seat. SCS conservationists, working through district-municipal agreements, have given help in seeding, drainage, soil sur-

veys, sewer development, and many other conservation-related problems in Sevierville's new industrial park.

The Sevier District office has become known as a source of information for any land use problem, no matter how unorthodox. ♦

Conservation association wins antilitter award

Antilitter activities of the Jemez Mountain Wildlife and Conservation Association in 1969 won a Certificate of Award from Keep America Beautiful, Inc.

The Jemez Soil and Water Conservation District recently sponsored a dinner honoring the association at Jemez Springs, N. Mex., at which SCS State Conservationist Kenneth Williams made the presentation. SCS had nominated the association for recognition.

In addition to the antilitter and general cleanup campaign, the association carried on projects in fish and wildlife restoration, gun safety instruction, and erection of historical markers. Now there is a new sanitary landfill in Jemez Springs, and the roads are provided with litter barrels maintained by the group.

In August 1966 the association entered into a cooperative agreement with the Jemez Conservation District. SCS then helped the club develop a conservation plan for the Jemez and Guadalupe valleys. Cooperation of the village of Jemez Springs, the New Mexico Game and Fish Department, New Mexico Highway Department, U.S. Forest Service, and the Boy Scouts contributed to the program's success.—
RICHARD BARBER, *district conservationist, SCS, Bernalillo, N. Mex.* ♦

Children in the Moundsville Housing Development, Moundsville, W. Va., used to be able to play house in backyard gullies. But their housing situation changed after concerned citizens and officials moved in to control erosion.

Fescue and crownvetch now cover most of the 20 to 30 percent slopes in the 10-acre public housing project. For 3 years, the tract was a critical sediment source. Mud holes, craters, and gullies scarred the site soon after building first exposed the highly erodible silt loam soil in January 1966.

By June 1966—more than 6 months before the project was completed—people began to move in. Their traffic added to the disturbance initiated by bulldozers. All 75 apartments were occupied a year later when erosion was at its worst. Because of limited funds, landscaping and the roof drain system could not be completed. Erosion eventually ruined final grading on 5 acres of bare soil around buildings and streets after construction was completed in January 1967.

Alarmed by conditions during and after construction, the Moundsville Housing Authority and the

Erosion-control program comes to rescue of housing project

By Moses Taylor

Soil conservationist, SCS, Moundsville, W. Va.

Northern Panhandle Soil Conservation District joined in two erosion-control projects.

The first was begun in the fall of 1967. Plans for grading, adding topsoil, and seeding the site were prepared by the Soil Conservation Service and the county extension agent. The city of Moundsville loaned earthmoving equipment. Organic matter was donated by the local mushroom plant. Six teenage boys from the local Neighborhood Youth Corps put in 240 man-hours hand seeding some of the lawns in the development.

The pilot project convinced local officials that the job could and should be done, but that it would take more than volunteer help and a few dollars' worth of seed. After another series of meetings, action began again in September 1968.

The housing authority contracted

to have the site regraded and the drainage system completed. Then a district labor crew, headed by District Supervisor Hubert L. Mason, spent 431 man-hours carrying out a plan developed and supervised by the Soil Conservation Service. It took 500 pounds of seed; 33 tons of lime; 2,500 pounds of fertilizer; 1,500 cubic yards of topsoil; 600 bales of straw; and 500 yards of fiber netting.

Today only minor maintenance is needed to keep the stabilized slopes in good condition. Determined to avoid similar problems in the future, the Marshall and Ohio County planning commissions have established cooperative relations with the Northern Panhandle Soil Conservation District to make soil surveys and other technical information available in advance of starting new developments. ♦



Francis Kolz, district crew member (left), and Moses Taylor, SCS soil conservationist, lay netting over a critical area seeded and mulched in November 1968. Below, Kolz looks over a finished job consisting of straw mulch, Bemis netting, and 2 by 4 planks set into a steep slope.



Homes for purple martins

By George C. Marks

Assistant state conservationist, SCS,
Little Rock, Ark.

A sudden influx of 28,000 temporary residents posed no housing problem for Fort Smith, Ark., last year. The visitors repaid their host community with an insect-control program and months of free entertainment.

Purple martin flocks didn't just happen to descend on the Fort Smith area. They were attracted by the kind of nesting environment provided by local people. Many knew that the birds preferred communal living and people-watching, so they built multiple family units in open spaces near human habitation.

It all started with a plan developed by Pat Burke, SCS biologist, and backed by the Sebastian County Conservation District.

With the help of local news media, a 5-month information campaign convinced townspeople that martins could and should be invited to Fort Smith.

The first part told about the martins' insatiable appetite for flying insects, their cheery chatter, and graceful flight patterns.

The second phase of the information program explained the birds' preferences for apartment living and certain building specifications and neighborhoods.



Mrs. Jannelle Davis, SCS clerk-typist, observes one of the purple martin houses put up in Fort Smith, Ark. Its telescopic pole facilitates cleaning.

In all, 22 feature stories, many of them illustrated, were carried by the daily newspaper. Local television and radio stations aired more than 58 spot announcements extolling the virtues of purple martins. An outdoor advertising agency cooperated with local business firms to finance three highway billboard signs. Civic organizations and bird and garden clubs in Fort Smith and neighboring towns presented educational material at regular meetings. "Purple Martin Week" was proclaimed by mayors of both Fort Smith and Van Buren, and "It's

Specifications for a martin house

Exterior design seems to be of little importance, but individual apartments should measure 6 inches each way with a 2½-inch entrance hole 1 inch above the floor level. The floor should extend to form a porch about 3 inches wide with a guard rail to protect young birds before they learn to fly. To keep houses cool, paint the exterior white and provide a central ventilation shaft opening into a screened attic. Houses should be placed in open sunlight at heights of 12 to 24 feet, depending on the proximity of trees and other obstructions to flight.

Purple Martin Time" buttons were handed out. Exhibits at the county fair and the annual horticulture show rounded out this phase of the effort.

Increased public interest in martins brought on stage three as planned. Local business establishments were glad to stock ready-made martin houses. One company sold more than 600 during the campaign. Many people preferred aluminum houses, which are available from several commercial sources. They are light, easy to install, and have a long, useful life.

Some, however, enjoyed building their own martin houses, even though they saved little or no money in the long run. For home craftsmen, the district financed a simple set of plans and distributed at least a thousand free copies.

By conservative estimate, there were 28,000 temporary residents of the Fort Smith area on any given day. And it is nice to know that the friendly, useful creatures will return each year after their annual vacation in Brazil. ♦

India joins 'green revolution' with plans to boost food yields

By Eugene W. Shaw

Irrigation agronomist, SCS, Bellary, India

High-yielding, short-season grains, improved cultural practices, and efficient irrigation methods are combined in the Mysore Regional Pilot Project to increase grain production in people-rich, food-poor India.

The project, established jointly by the U. S. Department of Agriculture and the U. S. Agency for International Development, became the first of three such projects now cosponsored by the Indian Government and the state government.

Since late 1967, the Soil Conservation Service staff, under the leadership of Guy W. Nutt at Bangalore, has been surveying problems and preparing a project plan. SCS staff members in Mysore are Eugene J. Pope, engineer; Gerald Kester, soil scientist; and Eugene W. Shaw, agronomist. Their headquarters are at Bellary, in the Tungabhadra Irrigation Project.

From the beginning, the project plan emphasized onfarm demonstrations. By posting the Indian staff and American counterparts in early 1969, the first such demonstration was underway the following June.

This demonstration, which is not only the first but also the largest to date, involves all irrigated areas of Manur Village in Bellary District and its administrative subsidiary, Manur Camp.

More than 700 acres of irrigated land is involved in a revised water

regime, based on comprehensive needs, plus the use of new short- and mid-season varieties of rice, wheat, and sorghum. The demonstration requires cooperation from Mysore's Department of Public Works (irrigation) and Department of Agriculture, India's National Seeds Corporation, and the project staff.

The demonstration area was selected because of its location at the lower end of a distributary, or canal. Normally it lacks sufficient water because of ditch losses, and development there has been restricted in the past to about one-half of the planned acreage.

Starting in June 1969, all rice farmers in the demonstration area agreed to sow only Padma, a new high-yielding, early maturing variety of rice. The project supplied

seed with the cooperation of the National Seeds Corporation. Followup studies on nearly 160 acres checked for insects, diseases, and fertilizer requirements—a phase closely observed by the state officials and local farmers alike.

In October 1969, the waterflow was shifted to another area, almost 60 days earlier than possible with traditional long-duration varieties. At that time 400 acres of Mexican wheat and hybrid sorghums were irrigated, using improved water-application techniques.

Conservation planning, with an initial meeting of all landowners, began in August for the areas to be irrigated in October. Later, team members made individual contacts with completed topographic maps.

The third proposed irrigation season commences in February—the beginning of summer—and, because of the normally high seasonal temperatures, only 200 acres will be irrigated.

Water distribution, planned to meet plant needs, is a new concept to India. Hopefully, this demonstration will produce major changes in seasonal distribution and more efficient use of available water in India's promising Mysore state. ♦



Gerald Kester and Eugene J. Pope (center, left and right, respectively) confer with Indian officials during a project meeting at Manur Camp.



The biology class (left) takes an early look at the new pond, and a vocational agriculture class (above) gets instruction on preparing the seedbed for a grassed waterway.

"Just a little puddle would help . . ."

Outdoor learning areas give teachers a chance

**By Millard Blaine, Kelly Rogers,
and Harlan Wingfield**

District conservationist, SCS, and assistant
superintendent and science specialist,
Knox County Schools, Edina, Mo.

It all started with two science teachers wishing for a biology pond.

"Just a little puddle on the school grounds would help," said William Frazee to his colleague, Mrs. O. M. Gillaspy.

Mrs. Gillaspy called the attention of school officials to the difficulty science teachers were having in teaching biological sciences, chemistry, and conservation effectively inside the classroom. The superintendent and his staff began looking for ways of providing the science department with its nature pond. Title III of the Elementary and Secondary Education Act seemed to offer a possible source of funds.

Leaders in various activities involving young people, agricultural groups, service groups, and state and federal agencies were called in to the school for consultation. Each group was asked how it might use

the facilities if they were available.

Soil and water conservation leaders, state wildlife conservation representatives, Boy Scout groups, Girl Scout groups, and others expressed interest in the proposal. Thus encouraged, the Knox County R-I School District prepared a project application, and it was approved for assistance with Title III funds.

The Soil Conservation Service then provided technical service and advice in planning the pond and other work on the area. Waterways and terraces were constructed and several grass plots seeded to demonstrate ways of controlling erosion.

Students use the pond to study basic biological, chemical, and physical features of an aquatic environment. They observe and identify flora and fauna and collect data on water pressure, turbidity, sedimentation, acidity, and oxygen content.



Left, SCS Conservationist Millard Blaine (without coat) discusses plans for a wildlife habitat area with Dr. John Ross, superintendent of Knox County Schools (left) and Dr. Kelley Razen, assistant superintendent of the schools. Below, Vocational Agriculture Teacher Eldon Ewall discusses minimum tillage with his class of 1967 and 1968.



Here, vocational agriculture classes can see conservation in action and observe the effects of good practices on the land. They can study how waterways and terraces control erosion, and they can gather information on the growth of grasses, crop resistance to herbicides, soil pH, and methods of determining forage yield.

Many small animals have come to the school grounds since the project was started. Rabbits, squirrels, and birds, attracted by the wildlife habitat, are enjoyed by the students.

Other classes, such as social studies, art, industrial art, and history, make use of the outdoor laboratory, too. Eventually the entire faculty of the Knox County school system will be instructed in the use of the area.

Classes will be held during the winter. Knox County school administrators believe students will benefit more from their outdoor laboratory if it is used the full 9 months of the school year instead of only when the weather is good.

Schools in other counties have asked to use this outdoor classroom.

The Knox County Soil and Water Conservation District intends to use it as a main stop on conservation tours to illustrate practical and usable structures and methods of soil and water conservation.

A further cooperative program between the Knox County R-I School District and the soil conservation district is the construction and development of a 15-acre lake and other conservation demonstrations on a 449-acre farm owned by the county.

To let the public see many phases of conservation in action, the development of this area began with a field day that lasted 2 days. District supervisors and county court and many local individuals and businesses worked together with the Soil Conservation Service, Extension Service, and the Agricultural Stabilization and Conservation Service to make the field day a success.

The county farm has the same demonstrations as those at the high school. In addition, a nature trail will wind through 20 acres of good timberland. Here students will be able to study the plant and animal life of a typical Missouri forest. Conducted tours by a science specialist will be available for all classes. Research can be carried on by interested students. A brochure that explains each stop on the tour will be available for students and teachers. Public and private organizations will be encouraged to tour this facility.

The outdoor laboratory at Knox County High School and at the county farm give Knox County a modern and effective way of teaching science and conservation. ♦

A money-making way to 'play the horses'

By George W. Yates

Staff conservationist (recreation), SCS, Jackson, Miss.

Horseback riding is an outdoor recreation activity that offers farmers opportunities for supplemental income—especially those with a sizable acreage of developed pasture. City and town dwellers need places to keep and ride their horses safely.

Riding for recreation is enjoyed by Mississippians of all ages, but perhaps is most popular among teenagers.

Most horseback riding is simply unorganized pleasure riding. Many

enthusiasts also take part in "trail rides," belong to riding clubs and "sheriff's posses," and participate in rodeos and other competition events.

Many new stables

This activity has resulted in the establishment of many commercial horse stables throughout Mississippi. In the vicinity of Jackson there are at least 10, many of which have more business than they can handle.

Taylor's Ranch in south Jackson, Miss., owned and operated by Mr. and Mrs. W. E. Taylor, has been in business for 2 years. The Taylors keep 10 or 12 horses most of the time, although Taylor has other full-time employment.

"We got into this business after making arrangements for our own five horses. It just grew from there,"

The increase in horseback riding has stimulated the horse-stabling business.

Taylor says. "We really don't have enough room for all the horses and are planning on building a new barn with at least 20 stalls."

4-H program expands

The increase in horseback riding has also stimulated the horse stabling business in delta counties. John R. Fulcher, Washington County agent, reports that three horse-boarding stables have opened on the outskirts of Greenville in recent years.

"We added horses as a project in our 4-H Club program about 5 years ago, but there was no interest in it for a year or two," Fulcher says. By 1968, however, horse proj-

Riders enjoy a trail developed by a conservation district cooperators near Orange Grove, Miss.



ects were the most popular among 4-H clubbers.

"Furthermore, horseback riding is usually a family affair, not just limited to the 4-H member," Fulcher says. "The family usually has at least one or two other horses."

Horses go to college

This seems to be supported by the fact that many college students take their horses to school with them and create an unusual demand for facilities there. So many Mississippi State University students have horses that at least three boarding stables have been opened nearby.

Following many requests for such facilities, W. P. Sudduth, Starkville, Oktibbeha County Soil Conservation District commissioner, recently built a new horse barn. Now he stables more than 20 horses for college students on a monthly fee basis. Sudduth was already in the dairy and beef cattle business and had a considerable acreage of pasture.

T. A. Mauldin, SCS, Starkville, says Sudduth also opens all his pastures to the riders. He is considering providing a system of riding trails over most of his large farm.

Necessary facilities

Fees for boarding and stabling horses depend on the care and services provided. Some stables furnish feed, pasture, medication, training, riding lessons, and stalls in various combinations. Rates generally range from about \$25 a horse a month for basic needs to as high as \$50 when all or most of the services are included.

At any rate, stabling riding horses can be a money-making sideline for many farmers in Mississippi, depending on present layout and farming system.

SCS can help plan and develop pastures, recreation areas, and other facilities for boarding and riding horses. Those with good locations who are already in the livestock business and have plenty of pasture can cash in on the horse's comeback. ♦

Reclaiming the heritage of old mill dams

By Richard L. Pratt

Engineering specialist, SCS, Acton, Mass.

Conservation districts in Massachusetts receive many requests from town commissions, sportsmen's clubs, and private landowners for assistance in renovating old mill dams to make impoundments useful for wildlife and recreation.

Massachusetts, like other Northeastern States, is dotted with mill ponds and dams that supplied power to grind grain, saw lumber, and operate small factories, a hundred years or more ago. The old mills have long since vanished, but the dams occupy choice locations, and local communities want to convert them to modern uses.

The Soil Conservation Service usually limits its assistance to preparing a reconnaissance report on the structure and making recommendations based on the hydrology of the stream and the physical features of the site. Conservationists and biologists may also help plan the development of wildlife habitat and recreation facilities.

Yesterday's design

A typical old mill dam may be as much as 300 years old. It usually has several square miles of drainage area, since mill operation depended on a high base flow and an adequate water supply stored from surface runoff. In most cases the original structures have been repaired or replaced.

Most of the dams are of the open-weir type, constructed of hand-placed stones, concrete, or timber. They usually are less than 10 feet high and 10 to 12 feet wide at the top. Side slopes, both upstream and downstream, are vertical and retained by stonework. The space between the two walls was filled with rocks, boulders, earth,

and other available material. Side emergency spillways were not used. The mill race provided some extra discharge capacity in times of high water.

Most of these old dams leak, and many principal spillways have been washed out. Tree roots often penetrate or undermine the fill, resulting in piping out of adjacent material and eventual collapse of the unsupported structure.

In most instances restoration is neither simple nor inexpensive. Temporary patchwork is difficult and usually results in leakage or failure in another part of the dam.

Replace or rebuild

If the old structure is in a high-hazard location, the SCS recommendation usually is to build a new dam with a weir-type overfall having a large discharge capacity. Flood storage is not significant in most cases, and the storm flow must be discharged by the structure.

In less hazardous situations, the existing dam may be reinforced. An impervious blanket of fill is placed against its upstream face, with a 3 to 1, or flatter, slope and a minimum top width of 10 feet. A core trench to impervious material should be excavated if necessary. A principal spillway should be an overfall structure, as for high-hazard locations. A graded-gravel filter may be placed at the downstream toe to lower the hydraulic gradient through the fill and to prevent piping of finer dam material.

By sound renovation and well-planned development, a heritage from New England's historic past becomes a prized part of today's living environment. ♦

Conservation in action...

Contours fix property line

Minnesota

Rural housing has a habit of cropping up almost anywhere, but it isn't often that you'll find a home occupying an odd area in a contour-stripped field.

When Conservation District Co-operator Ben Posch sold his farm and wanted to get closer to town, he propositioned Arnold Newman, a fellow cooperator in the Morrison Soil and Water Conservation District of Minnesota, to sell him a 1-acre odd area along the blacktop road. Newman agreed to sell if they could locate the property boundary on the contour line. They did! Posch got an attractive building site and Newman did not have to disturb his terraced and contour strip-cropped field.

The Posches have planted pine trees back of the house on the contour property line and as a screen along the road. "We like the location and enjoy the view," Posch said.

Newman established a complete erosion-control system on his farm 5 years ago. His crops reflect good husbandry of the soil, and the broad sweeping contour lines add to the beauty of the countryside. Posch's country home fits the modern concept of good land use.—RUSSELL V. JONGEWAARD, *district conservationist, SCS, Little Falls, Minn.*

Texas

Small-fry farmers find Fischer's Fun Farm fun

On land where wagons once hauled good blackland cotton W. C. Fischer's wagon now hauls preschool children and, instead of a cottonfield, the place is Fischer's Fun Farm located near downtown Dallas, Tex.

Fischer, a cooperator with the



The Poaches' contoured homesite.

Dalworth Soil and Water Conservation District, converted part of the wornout farm into a nursery-day camp in 1961. Improvements, such as playground equipment, pony rides, and crawdad ponds for lazy summer fishing, were added later. An air-conditioned game room and a concrete waterfall-wading pool for younger children are under construction now, and plans are underway for future recreation facilities.

"Parents appreciate their children getting to enjoy a rural atmosphere," Fischer says. "These kids learn to care for the animals we have, and they also become aware of the beauty of the countryside." Fischer's school bus transports the children to and from Dallas each day. In addition to the day camp, Fischer operates an antique business on weekends.

Dallas County's rapid-growing population makes recreational land and facilities of prime concern, not only for adults but for children. W. C. Fischer and Fischer's Fun Farm help meet this need.—RONNIE TIDWELL, *soil conservationist, SCS, Dallas, Tex.* ♦

North Carolina

Conservation plan helps improve small farm

A soil conservation plan has been the basis of James Strickland's success in providing a comfortable living for a large family on a small farm near Mount Airy, N.C.

Strickland bought 39 acres 24 years ago, and soon found himself fighting a losing battle with erosion on his sloping fields. In the early fifties, he became a cooperator with the Surry Soil and Water Conservation District. He converted the more erodible land to pasture and hay and established a tobacco-grass rotation on the remaining cropland.

In 1956 he obtained a loan from the Farmers Home Administration, and in 1964 increased it to do more conservation work and begin a poultry enterprise. He now can grow about 50,000 broilers a year.

Grassed waterways were seeded and field borders established to protect turn areas and improve habitat. Steeper areas were seeded to grass with assistance from the Agricul-



Left, Culpeper Golf Club's water problem. Right, Dr. Donald Pryer (left) saves a tree in building pond. With him is SCS Conservationist Jim Loe.

tural Conservation Program in early years and later under the land-treatment phase of the Appalachian Regional Development Act. In 1967, he purchased 2 acres of adjoining land and seeded it to grass and clover.

Strickland keeps a milk cow and a few riding horses. There is a ready market nearby for all the hay he can produce.

In a swampy area he built a pond that has become a swimming, boating, and fishing center for the neighborhood.

With all this, Strickland finds time to serve as pastor for three small churches in the area.—B. F. PATTERSON, *district conservationist, SCS, Dobson, N.C.*

Virginia

Golf club solves its flooding problem

For as long as 30 days at a time, playing golf at the Culpeper Country Club in Culpeper, Va., was stopped because the fairways were covered with mud and water. Large gray-brown spots, where the turf had died because of waterlogged soil, were permanent features on the fairways.

In response to an inquiry to the Culpeper Soil and Water Conservation District, I reviewed the problem on the ground with a group of members. Our observations and information from the soil survey indi-

cated the need for a diversion ditch and about a mile of tile drains. The club became a cooperator with the district to carry out the plan.

Solid plastic pipe was used where the tile had to pass near trees to prevent roots from stopping up the system. Gravel was placed over the tile on points where water normally concentrated to speed up the draw-down of excess water.

Now members enjoy a healthy turf and can resume playing almost as soon as rain stops.—DAVID J. POE, *district conservationist, SCS, Culpeper, Va.*

Louisiana

Developer starts with a conservation plan

Land developers and homeowners are finding that conservation pays them as well as it does farmers. Dr. Ronald Pryer of Pineville, La., proved it on an 18-acre tract he started to subdivide in 1966.

Pryer became a cooperator with the Lower East Red River Soil and Water Conservation District and developed a conservation plan with the help of the SCS staff. Information from a soil survey of the area was used to locate a building site for himself, a pond site, and areas for subdivision.

The pond was designed to be placed among the trees so they would not be disturbed by building equipment, or by the water.

A spring above the pond was developed to flow into a swimming pool, then into the pond. The pond was stocked with fish. In thinning trees and clearing underbrush all the flowering shrubs were left.

Pryer's home is almost completed, and he has sold several building sites. He says he is convinced people want to live where there are trees and water and a pleasant landscape.—JAMES LOE, *district conservationist, SCS, Alexandria, La.*

New Jersey

Youths plant beachgrass for storm protection

Planting beachgrass on ocean-front dunes continues to catch the interest of youth groups at New Jersey's Cape May County shore resorts.

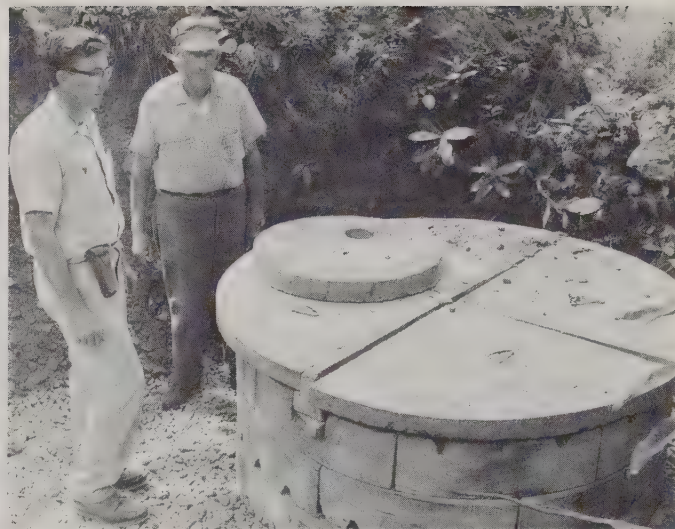
The end product of the activity—more green vegetation on dunes—speeds up Nature's sand-catching process, which builds up the dunes and improves their ability to hold back storm-driven high tides.

One day last fall, some 25 blocks in Avalon were planted to beachgrass by 250 youngsters and their leaders. Girl Scouts, Boy Scouts, and 4-H Clubs joined in the affair. Lunch was provided for the young workers and prizes awarded for the best plantings. Each group also received a cash reward for its treasury.

In a separate planting session last November, vocational agriculture



The county agent and 4-H leader, Larry E. Newbold and Ann Wigglesworth (at left), supervised beachgrass planting at Avalon, N.J.



Selmer Longseth's dry well spring box. With him is SCS District Conservationist Olin Fimreite (left).

students from the Lower Cape May Regional High School lent a hand in protecting Cape May Point, one of New Jersey's most critical beach erosion areas. The class added the protective beachgrass to 2,000 feet of the troubled dunes in that one session.—JOHN A. KROHN, *district conservationist, SCS, Berlin, N.J.*

Wisconsin

A drink after 50 years from restored spring

"I remember when this farmstead got its water from a spring right here," Selmer Longseth said as we looked among the broken foundations of vanished buildings on the back of his farm.

"I'd like to find it and develop it for watering my cattle."

We could see no sign of wetness or water-related vegetation, but suggested he have the site dug out with a backhoe. The results confirmed his recollection; when 4 feet of overburden was removed the long-buried spring bubbled out.

Longseth let the spring flow for 2 months to observe its strength before proceeding to install the spring box suggested to him as a cooperator with Trempealeau County Soil and Water Conservation District.

A dry well enclosure 4 feet high

and 6 feet in diameter was constructed of perforated blocks over the spring. Coarse gravel was then put around the box, allowing water to flow freely into it. A 1½ inch pipe was installed to bring water to a livestock watering tank.

"That's the first drink I've had from that spring in 50 years," he said when the job was finished.—OLIN FIMREITE, *district conservationist, SCS, Whitehall, Wis.* ♦

Highway erosion control studied

During the next 5 years five unnamed watersheds in Cumberland County, Pa., will be used in a project to study erosion-control methods that will be tested with the construction of Interstate Highway 81.

Four of the streams lie in the construction area of part of the superhighway. The fifth stream, outside the immediate construction area, serves as a "control" for comparison of the effects of construction and conservation practices on the streams.

In each test area measurements will be made of volume and velocity of streamflow and of the amount of suspended sediment in the water.

Regular checks will be made to determine stream conditions before construction. Sampling will continue for a full year after construction is completed in late 1971.

A different combination of conservation practices will be tested in each watershed: (1) Mulching and seeding during the first planting season the highway slope is completed; (2) mulching right after earthmoving begins and standard seeding during the first planting season the slope is completed; (3) use of temporary desilting basins, diversion terraces, or an advanced erosion-control measure, such as an erosion inhibiting chemical applied to exposed slopes; and (4) these measures combined with vegetative cover.

The project will be conducted jointly by the State Soil and Water Conservation Commission of Pennsylvania, Water Resources Division of the U.S. Geological Survey, and the Pennsylvania Department of Highways. The Soil Conservation Service serves in an advisory capacity. ♦

Ponds bring change from general farming to specialty crops

By Marvin Hansen and Phillip Boots

Area conservationist and district conservationist, SCS, Traverse City and Onkama, Mich.

Some 500 new farm ponds in Manistee County, Mich., are enabling farmers to change from the old general farm, which was a little of everything but not enough of anything, to high-value specialty crops like strawberries, potatoes, and small vegetables.

The first ponds were built for trout production. Now they are being designed for irrigation, frost control during the strawberry blossoming period, and air temperature control while berries are ripening.

Equipment sales

Ponds are being enlarged to accommodate larger equipment and allow for the irrigation of more acres. One dealer estimates that \$4.5 million worth of irrigation equipment has been sold in Manistee County in the last 10 years. Cherryland Rural Electric and Consumers Power Company are expanding their services to provide three-phase power for irrigation.

Increased supply and lower cost of water have stimulated the berry business. Strawberry acreage has increased from 15 acres in the late 1940's to more than 1,000 acres today.

More jobs, too

Job opportunities and local economy have grown, too. Four to five thousand extra people are needed during harvest season. Another 500 pair of hands are required to process the output of the county's million dollar berry business.

Potato and small vegetable acreages are also increasing. A new

potato co-op recently completed a building in Copemish, Mich., that holds 200,000 bushels.

The average cost of a typical pond is \$1,500. Many have been cost-shared with funds from the Agricultural Conservation Program. The Soil Conservation Service furnished technical assistance on feasibility and design through the Manistee County Soil Conservation District. ♦

Workers pack some of the strawberries grown on an irrigated farm that yielded more than 700 cases per acre.

Four irrigation pumps fed by this pond move 1,200 gallons a minute. Each provides frost protection for 60 acres of strawberries.



Ecotactics: Where the action is



The Environmental Handbook. EDITED BY GARRETT DE BELL. 1970. Ballantine Books, New York. 367 pp.; paper. \$0.95. *A Ballantine/Friends of the Earth Book, prepared for the first National Environmental Teach-in.*

Ecotactics. The Sierra Club Handbook for Environmental Activists. EDITED BY JOHN G. MITCHELL AND CONSTANCE L. STALLINGS. 1970. Pocket Books, New York. 288 pp.; paper. \$0.95.

These two books, quickly put together in preparation for the series of environmental forums ("teach-ins") held on college and high school campuses in April, convey a sense of serious purpose and urgency that leaves no doubt that young people are concerned to the point of action about deterioration of the human environment. Naturally, the books show the unevenness of content that is inevitable in such an effort.

Both books consist of a collection of articles, some brief and some longer, some emotional and others reasoned and deliberate, that state the case against pollution of the environment and suggest a variety of countermeasures.

The Environmental Handbook is substantially laden with reprints of sober articles and excerpts from books by such distinguished scientists and authors as Lewis Mumford, Kenneth E. Boulding, Rene Dubos, Garrett Hardin, Lynn White, Jr., and Paul R. Ehrlich. These are set in a matrix of brief, off-the-cuff pieces by the young people carrying the argument of the current environmental campaign. The book contains sections on suggested "ecotactics" of individual action and political action, and well-chosen lists of books and films on human ecology and related subjects.

Ecotactics consists of a collection of original writings by a variety of

authors, some of them students. It, too, has a bibliography, called "the activist's bookshelf;" rosters of conservation and professional organizations and government agencies; a directory of chairmen of strategic congressional committees; and, of course, a Sierra Club directory and list of its films.

Conservationists must be gratified by the sudden awakening of the public to concern about the way we use our resources. The extent of that concern is indicated by the sale of these two books. The first, issued in January, was in its second printing in February.

Whatever one's judgment may be of the factual basis of specific statements or of the soundness of some of the tactics proposed, he needs to read these two books as soon as possible to be aware of the latest turn of the conservation movement in America—B. O. O.

Urban environment

The Quality of the Urban Environment. EDITED BY HARVEY S. PERLOFF. 1969. *Resources for the Future*, Washington, D.C. (distributed by The Johns Hopkins Press, Baltimore). 332 pp.; paper. \$6.50.

A collection of essays on "new resources" in an urban age, prepared for a conference on urban environment sponsored by Resources for the Future, provides a useful sampling of some of the newer thinking in this field of resource use.

Editor Perloff, in an introductory statement setting the framework for the discussion, argues for an extension of the concept of resources. Rather than being limited to the elements of the natural environment needed for the production of commodities, resources in the modern

setting include any "needed elements . . . that are in relatively short supply." These, he says, include "relatively pure air and water, three-dimensional space (including airway space, radio-spectrum space, city land, and underground space), and valued amenity features . . . in our crowded urban age, these are resources that count."

A second concept that can contribute to support for effective public policies "is a view of the urban environment as a contained (but not closed), highly interrelated system (or subsystem) of natural and manmade elements in various mixes."

Against this background, a distinguished group of authors discuss pollution and environmental quality; contained urban space; open (uncovered) space; amenity resources; transport; the value of urban land; location, size, and shape of cities; and behavioral patterns of time and space use—B. O. O.

Using Commercial Fertilizers. BY MALCOLM H. MCVICKAR. 1970. 3d. ed. Interstate Printers and Publishers, Danville, Ill. 352 pp., illus. \$8.50.

The third edition of this well-known book is considerably expanded over the second. There are three new chapters, dealing with bulk blending, fertilizer efficiency, and soil amendments. The entire book has been updated to reflect new advancements made in the use of fertilizers during the past 9 years.

This book contains much information on the amount of fertilizer used in the United States and changes in the different plant nutrients. For example, since 1958 the use of nitrogen has increased more than other nutrients and is expected to reach 12.5 million tons by 1980, or twice as much as phosphate or potash.

There is a good glossary of terms relating to fertilizers and a complete listing of major fertilizer plants in the United States.

This is an excellent reference book for students, conservationists, and farmers on the many aspects of fertilizer use and plant needs.—**B. D. BLAKELY**, *head agronomist, SCS, Washington, D.C.*

Soil surveys

Torrance Area, New Mexico. BY BOB G. BOURLIER, R. E. NEHER, D. B. CREZEE, K. J. BOWMAN, AND D. W. MEISTER. 1970. 149 pp., illus.; map 2 inches to the mile (1:31,680).

Curry Area, Oregon. BY CHARLES R. BUZZARD AND CLYDE C. BOWLSBY. 1970. 70 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by Gene K. Brinneman, Oscar P. Mueller, and Charles R. Buzzard.

Antelope Valley Area, California. 1970. 187 pp., illus.; maps 2½ inches to the mile (1:24,000). Fieldwork by George A. Woodruff, William J. McCoy, and Wayne B. Sheldon. ♦

Western water outlook is good—and bad

Outlook for water supply in the Western States appears to be adequate except for parts of the Southwest, according to the March snow survey report.

Reservoir storage was average or above in all states but Washington and should supply adequate water for major irrigated areas. Water users who rely on natural streamflow, however, can expect late-season shortages in some areas. Considerable pumping from groundwater storage can be expected for the Gila River in New Mexico and Arizona to supplement low streamflow. ♦

RC&D Project expanded

The Penn-Soil Resource Conservation and Development Project in Pennsylvania has been expanded to include Erie County, adding more than a half-million acres to the original 1.5-million-acre project area. ♦

Meetings . . .

Audubon Society to question 'progress'

A pointed question, "What is progress?" will be the central concern of the annual convention of the National Audubon Society at Seattle, Wash., May 14-18. It will be echoed in a discussion offering the points of view of ecologists and technologists featuring a panel drawn from many disciplines.

Membership in the National Audubon Society now involves more than 100,000 individuals. To better service its membership, the society is sponsoring a workshop for chapter leaders, regional field staff, and others in conjunction with the convention. Workshop sessions come before and after the convention program.

Garden Club promotes conservation

The Garden Club of America will hold its annual meeting in Boston, Mass., May 11-14. It is not open to the public.

Organized in 1913, there are now 177 clubs with about 12,000 members. Purpose of the club is to promote gardening, horticulture, and all phases of conservation. The Conservation Committee assembles and distributes an educational packet. The club is represented on the Advisory Council of the USDA National Arboretum in Washington, D.C.

Women voters take stand on resource conservation

The League of Women Voters national convention in Washington, D.C., May 4-8, will bring together some 2,000 women delegates, at least one from each of the 1,257 local leagues throughout the country.

To celebrate its anniversary, the league has launched a year-long

campaign focusing on the right to vote as the basis for American democracy.

Issues to be decided at the convention are what stands the league will take on legislative action to conserve natural resources; foreign policy, including expansion of world trade and economic aid to underdeveloped countries; ways to expand equal opportunity in jobs, education, and housing for all Americans; and reform of state and local governments.

Garden Clubs to discuss tomorrow . . .

The National Council of State Garden Clubs will hold its annual meeting in Chicago, Ill., May 17-21.

The theme is "The Shape of Tomorrow," with subthemes for each day: "Tomorrow is Today," "Tomorrow's Heartbeat," "Tomorrow's Tempo," and "Tomorrow-Tomorrow-Tomorrow."

Dates and places

May 3-6, Soil Stewardship Week
4-7, National Forest Products Association, Washington, D.C.

4-8, League of Women Voters of the U.S., Washington, D.C.

6-8, Forest Farmers Association sponsoring Southern Forestry Conference, Mobile, Ala.

10-15, International Science Fair, Baltimore, Md.

11-14, The Garden Club of America, Boston, Mass.

14-18, National Audubon Society, Seattle, Wash.

17-21, National Council of State Garden Clubs, Inc., Chicago, Ill.

June

7-10, National Watershed Congress, Denver, Colo.

7-12, General Federation of Women's Clubs, San Antonio, Tex.

14-18, Air Pollution Control Association, St. Louis, Mo.

15-19, American Water Resources Association, Urbana, Ill.

20-26, Outdoor Writers Association of America, Inc., Coeur d'Alene, Idaho.

21-25, The American Institute of Architects, Boston, Mass.

21-26, American Water Works Association—National Symposium on Hydrobiology, Washington, D.C.

29-July 2, American Seed Trade Association, Lake Tahoe, Nev.

30-July 2, Federal and State Water Officials, Charleston, S.C. ♦

Recon . . .

A quick overview of the conservation scene

Six in 10 adults in the Nation's metropolitan centers would move to less urbanized areas if they could live anywhere they wished, according to a February 1970 Gallup Poll. The other four like it where they are. Almost one-third of those questioned would prefer living in a small town — the same percentage as found in an identical survey in 1966.

Montana SCS snow-survey records have been reinterpreted to help developers determine the feasibility of winter resorts in mountainous areas. Records of snow depth and water content already being kept for western water supply forecasts provided data needed to formulate these criteria for potential ski areas:

—From 12 to 18 inches of new snow or 4 to 6 inches of packed snow (about 2 inches snow water equivalent) is desirable as a minimum for skiable snow.

—These amounts of snow should be available for skiing by mid-December in 18 or 19 years out of 20.

Using these criteria, the Montana survey team prepared maps and overlays in response to increasing demand for this kind of technical guidance.

A modern version of the Civilian Conservation Corps described in a recent issue of *Cry California* would put all capable, willing Americans in a federally controlled talent pool. The proposed Conservation Action Corps would complement rather

than duplicate work of existing agencies that are "uniformly understaffed and overworked." Experts and amateurs of varied ages and skill requested on loan from the Federal Government could be assigned through field offices. State and local organizations in need of help might also contract with educational institutions. (In light of current manpower shortages in conservation districts, the CAC or something like it would help bridge the gap between the amount of work and the number of workers.) Some suggested functions are: monitor air and water pollution levels; check compliance with subdivision regulations; improve drainage and control runoff and erosion on public lands; and remove litter.

GNQ over GNP

Pollution controls will require a new 'ecological ethic' which would change the nature of the United States consumer society. There is a great need and growing support for the introduction of new values in our society—where bigger is not necessarily better, where slower can be faster, and where less can be more . . . whereby this country puts Gross National Quality above Gross National Product—SENATOR GAYLORD NELSON OF WISCONSIN.

The decorative, protective effects of tropical plant materials are beginning to register at the Mayaguez Hilton Hotel in western Puerto Rico. Specially selected island vegetation and a children's fishing lake are key elements of a landscape design being developed with SCS assistance. In response to a request from the hotel management, Caribbean area conservationists studied the soils and topography of a 2-acre project area and prepared a conservation plan. Regional and local plant materials specialists provided additional advice on plant culture in tropical gardens around the new lake. The project is expected to be completed this summer.

Thousands of playa lakes on the High Plains of Texas lose as much as 1.5 million acre-feet of water each year by evaporation, says Cecil H. Wadleigh, director of Soil and Water Conservation Research Division, Agricultural Research Service. Water that might otherwise recharge ground-water supplies cannot seep through layers of fine sediment covering the bottoms of these shallow lakes.

A new regrassing technique for arid rangelands is being developed in New Mexico. C. H. Herbel, a range scientist with the Agricultural Research Service, has used a mulch of uprooted range brush to establish grass effectively and economically on depleted brushy range. Apparatus created by engineer G. H. Abernathy of the New Mexico Agricultural Experiment Station plays a key role in the system described in the January issue of *Agricultural Research*.

Some California Creeks that used to be dry by June stay wetter longer now that their tree- and brush-covered watersheds have been converted to grass. Water yield has increased by an average of 50 percent per season. Professor H. Burgy of the Department of Water Science and Engineering sees better vegetation management on semiarid foothill land as a way to boost state water supplies. Conversion to grass costs 20 times less than sea-water conversion for the same amount of water produced on site. Water and range researchers with the University of California at Davis are checking the long-term effects of conversion on plant growth, livestock values, and soil erosion.



Resources and renewal

There is a new America every day, as new highways, new homes, and new shopping centers replace the remembered farms and vacant lots of yesterday.

A onetime wheatfield may have gone to pasture; a cornfield to buildings; a marsh transformed into a swimming lake or water reservoir. Good, bad, planned, or haphazard—changes in our physical environment and use of land and water are accelerating. Growing along with them is a growing concern by nonfarm citizens for quality of the environment.

These men and women are concerned, and rightfully so, with the problems that stem from unplanned and disorderly development. They experience the results of flooding, excess erosion, sedimentation, and air and water pollution. They see a lowering in their quality of living. Why, they ask, can't something be done?

Something can be done. For three decades, the Soil Conservation Service has assisted farmers and ranchers who faced similar problems on rural land—and who **did** something about them.

Building on the work of pioneer conservationists, SCS developed the principles, practices, and expertise needed for the rational development of rural land in a manner consistent with both the land's capabilities and the Nation's needs. Methods to control erosion, reduce flooding, remove excess water, and protect an area's natural beauty were tested and proved. These same conservation and land use principles and methods, with slight adjustment, are applicable to urbanizing lands.

Some of the principles are:

(1) Plan land uses that will minimize the potential problems of erosion, sedimentation, high water tables, and flooding, being mindful that as urban structures—houses, streets, and shopping centers—cover much of the soil, runoff and flooding increase, and pleasant little streams can become raging torrents;

(2) Use soil surveys as a basic source of

information for land use decisions;

(3) Gather and interpret other pertinent resource information, such as data about the topography, geology, and flood history of the region;

(4) Plan and install conservation measures that are both effective and economically feasible;

(5) Minimize the time bare soils are left exposed and vulnerable to accelerated erosion;

(6) Use trees, grass, and other permanent vegetation as much as possible but be aware of their limitations;

(7) Apply artificial protective cover, such as mulches, or establish quick-growing vegetation on land areas temporarily exposed to wind and water erosion;

(8) Limit the steepness and length of cut and fill slopes, both to avoid the concentration of runoff water and to facilitate establishing and maintaining good vegetative cover;

(9) Provide for the orderly disposal of storm water without erosion or flooding;

(10) Use dams and other mechanical controls, when needed, to help trap sediment unavoidably dislodged during construction;

(11) Provide for the protection and improvement of natural beauty as an integral part of conservation.

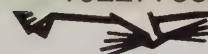
These principles, tried and proved in the Nation's soil conservation districts, need to be more generally recognized and put into use in urbanizing and builtup areas as well.

All Americans must realize that maintaining the quality of our resources, and of our total environment, is quite literally a part of the "cost of living."

Kenneth E. Grant



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Garden club project attracts songbirds

Wild songbirds come to Hazardville, Conn., in greater numbers now that food abounds for them around homes.

In early 1968, several Hazardville Garden Club members became interested in community beautification and inquired of the Soil Conservation Service about shrubs suitable for planting in their area. Cardinal autumn olive, they were told, produces abundant berries that remain on the bush well into winter and on which songbirds and other wild birds thrive.

By spring, the garden club distributed autumn olive plants to 500 third graders of Enfield Schools. The Hartford County Soil and Water Conservation District office in Warehouse Point instructed the students on how to plant autumn olive.

In Hazardville, as elsewhere, housing developments are often landscaped with trees and shrubs that offer birds ample cover, but little or no food. When landscaping includes shrubs that fruit at various intervals, residential areas can become bird sanctuaries.

The garden club's planting project was so successful that the club repeated it in 1969 and 1970. Similar projects are easily undertaken by garden clubs, conservation groups, 4-H clubs, Scouts, and other organizations.



Seedlings, planted by these Connecticut youths, get good treatment, including mulching with wood chips.

Hazardville's songbirds are not the only beneficiaries of community beautification. The townspeople also enjoy an improved urban environment achieved without undue effort or expense. Most important, many feel, is the firsthand knowledge the school children are receiving

in conservation.

Regardless of viewpoint, the project has already illustrated an excellent way to involve the public in local conservation programs.—ARTHUR B. CROSS, *district conservationist, SCS, Warehouse Point, Conn.* ♦

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Soil Conservation

Devoted to the wise use of land and water resources



Watersheds and clean water
Modern topographic maps

Cleaning up . . .

We approached this issue of **Soil Conservation** amidst an upwelling of concern about pollution and degradation of the human environment.

What accounting for their efforts can conservation agencies give the young people who joined in "Earth Day" teach-ins across the land?

This month we asked SCS field people to examine how the small watershed program relates to the central issue of environmental quality.

Water quality: From widely separated localities with just as widely dissimilar problems, we get reports of how watershed treatment is being designed to restore water quality.

In Pennsylvania (p. 243), a conservation district is using an RC&D project measure to stabilize strip-mine spoil and stop acid drainage into a stream.

In water-short west Texas (p. 245), a Public Law 566 project is stabilizing streamflow and reducing pollution by sediment and salinity.

And in Ohio (p. 255), the Forest Service joins SCS in helping project sponsors remove sources of pollution from an upstream watershed.

Water yield: And how does watershed treatment affect the quantity of water in a stream?

ARS researchers summarizing a long-term study of the Washita River watershed in Oklahoma (p. 247), find the results to be mainly in reduced flood peaks and better sustained flow during dry periods.

Computerized maps: The massive task of watershed planning needed (according to the Conservation Needs Inventory, **Soil Conservation**, December 1969) would be well-nigh impossible without the marvels of the computer age. Two SCS cartographers (p. 251) tell how the behind-the-scenes map and engineering data services are keeping pace with today's technological explosion.

Soil Conservation

Devoted to the wise use of land and water resources

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Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

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New life for Scrubgrass Creek . . .

Strip-mine reclamation keeps acid and silt out of stream

By Karl Hellerick

District conservationist, SCS, Franklin, Pa.

It may take 10 years, but we're going to bring Scrubgrass Creek back to life."

Richard Bell, postmaster at Clintonville, Pa., claims people living in Scrubgrass Creek watershed are determined to restore the stream to the fisherman's paradise it once was. The problem is acid draining from coal-mine operations.

Bell recalls the natural beauty Scrubgrass Creek once offered hunters, fishermen, and nature enthusiasts before bulldozers moved into this part of northwestern Pennsylvania during the early 1950's.

By the time strip mining began to decline a decade later, 2,000 acres of the 26,000-acre watershed had been defaced. Acid draining from exposed raw mineral soil on barren strip mines made 30 miles of the creek lifeless. Farms were abandoned. Fishermen and hunters no longer visited the area. The old swimming hole was gone. Public water and sewage facilities became inadequate.

People in this section of Venango County first learned Scrubgrass Creek was "dead" in 1957. That year the Pennsylvania Fish Commission routinely stocked the stream with trout the night before fishing season opened.

The next morning there were

many disappointed fishermen at the water's edge. People living along the stream reported that hundreds of fish had floated downstream on their backs the previous night.

In August 1968, directors of the Venango Soil and Water Conservation District met with people of the watershed in the Clintonville Fire Hall and established a Scrubgrass Creek Watershed Committee.

The new committee, backed by 26 private, civic, and governmental groups, gave top priority to reclaiming strip mines. The first step was to establish plant cover on the raw earth to halt erosion and check the washing of deadly acid from the

barren soil. Future plans call for new sewage and water facilities, recreation and a beautification program for the watershed.

The Venango Soil and Water Conservation District took the leadership in the reclamation program. It conducted a survey of strip-mine conditions and compiled a list of landowners in the watershed.

The Soil Conservation Service checked soil conditions and provided other technical information for each site.

The program was approved as a project measure in the Penn-Soil Resource Conservation and Devel-



Reduced acid in the water brings back the good old days to Scrubgrass Creek.



Boy Scouts plant more trees on strip-mine areas every spring.

opment Project, which contributed funds to implement the plan.

The district then held meetings to give landowners recommendations for reclaiming each stripped area. The Agricultural Stabilization and Conservation Service financed 80 percent of the cost of planting. State agencies furnished shrubs and seedlings.

The Colonel Drake Boy Scout Council and the Clintonville Youth Club planted seedlings on the strip-mined areas. Each spring, some 400 Scouts from 20 troops have planted around 100,000 seedlings. Now small trees are beginning to stop the soil from washing into streams. The outstanding work won the Scouts the national USDA Green Seal Award in 1969 and the Amos Hoople Newspaper Award 2 years earlier.

Clintonville Mayor Edna Adkins says the local youth club is keeping close watch over the growing tree plantations. She said a member reported that "one tree is doing well and all I did was to pile rocks around it."

The scrubgrass strip mines presented difficult sites for establish-

ing vegetation. There was little success with some spots of very acid soils, with pH as low as 3.5, until white birch was introduced by the Venango program. Plantings of this species are doing well. Bristly locust is proving successful on both steep slopes and level areas. The survival rate of seedlings for the entire area has been high, with red pine and black locust leading the list.

Although acid in the stream is being reduced, a major problem remains in the form of pockets of acid water trapped on the rugged strip-mine sites. During periods of heavy rainfall, these accumulations overflow into the stream and de-

stroy both plant and animal life that has begun to emerge. The RC&D Project measure provides for an experimental effort to meet this problem.

The plan is to install a lime treatment plant in conjunction with a floodwater-retarding structure. The treatment plant will distribute a lime slurry into the stream converting the acid water to an alkaline solution of pH 8.5 at the point of distribution. This water will flow into the floodwater-retarding structure to create a reservoir of alkaline water to be used in neutralizing stormflow in excess of the normal flow capacity of the lime plant.

Lime treatment plants are already being used by the Department of Mines and Mineral Industries to neutralize acid streams in other sections of the Venango District. SCS is cooperating with the Department in planning this new approach involving stored alkaline water.

When trout return to Scrubgrass Creek, as project sponsors hope they will, Postmaster Bell foresees the area as a major outdoor attraction for urban dwellers. Venango County offers the nearest mountain range to the Cleveland-Youngstown, Ohio, and Erie, Pa., metropolitan areas. ♦



White birch seedlings grow on very acid soil where other trees die.



Valley Creek landowner, Hugo Vogelsang (left), shows SCS district conservationist, Willard Hoffman, the restored creek.

"Our creek is running again . . ."

Watershed project holds stream between flood and drought

By Clyde W. Graham and Dale Allen

State conservationist and information assistant, SCS, Temple, Tex.

What effect does an upstream watershed project have on a downstream water supply?

Increased water yield, improved water quality, and a sharply reduced sediment rate is the answer you get if you ask Charles Clifton, a businessman and civic leader at Ballinger, Tex.

Clifton, who was mayor of this west Texas city when construction started on a watershed project above Lake Ballinger in 1964, said, "Our creek is running again, the useful life of our lake has been tripled, and our water isn't so salty anymore.

"Besides that, upstream flooding has been stopped, and soil conservation measures have helped improve the land, which in turn has helped boost our town's economy."

The work Clifton is talking about is an upstream watershed project partially installed on the 150,000-acre Valley Creek watershed which feeds Lake Ballinger. Some 15 flood-retarding dams have been built, and much of the conservation work needed on farm and ranch land has been applied. Five more dams are to be built as soon as construction funds are available.

Already the project is stabilizing streamflow.

Clifton says, "We used to be always going from flood to drought and back to flood in Valley Creek. A big rain would come along, our lake would catch full, and the rest of the water would run out the spillway. Before long, the creek would be dry and we'd be in another drought.

"But now, the soil conservation work slows the water down, letting more of it soak in and recharge the springs. The runoff water is stopped by the detention dams, which hold it back temporarily. Meantime, our lake has been staying full. The dams release the water slowly, giving us water to use for several additional days after each rain. Water has been running through the lake's spillway for more than a year. And it's coming in faster than we're using it."

But what's this about a dry creek starting to run again?

"Well, I was raised on Valley Creek," Clifton replied. "I can remember wading in the creek as a child in the early 1920's. It was fed by springs and ran clear and cool yearlong. In the early 1930's, it quit running. It would run after every rain, then dry up. But after we started our watershed work in 1964, the creek started flowing again and it's been running continuously for about 4 years."

Four watershed dams were built in 1964, two in 1965, and four in 1966. The creek quit flowing a couple of weeks during a drought in 1966. Then it started again and has been flowing ever since.

Hugo Vogelsang, a life-long resident and landowner on Valley Creek, has also seen the stream go full circle—from a live creek to a dry creek to a living stream. Vogel-

sang is president of the Valley Creek Water Control District, one of the sponsors of the watershed.

"I've seen the time when we'd have a big flood on the creek, then in 8 to 10 hours it would be back within its banks," Vogelsang said. "In a couple of days, it would be down to a trickle. In another week, it would be bone-dry. But now it's been flowing for 4 years except for that short period in 1966."

When the Valley Creek work plan was prepared in 1961, engineers estimated the lake's sedimentation rate at 95 acre-feet a year. Stepped-up soil conservation work and 20 floodwater-retarding dams were estimated to cut this to 33 acre-feet a year. At the 95 acre-foot rate, the effective life of Lake Ballinger was estimated to be 32 years. With the watershed-protection project, this should be stretched to about 90 years, or tripled.

Clifton also said that there had been times in the past when the lake was so low the water was almost too salty to drink, but it is of top quality now.

"I can remember when the chloride content was almost 500 parts per million," he said. "When the creek started running again, the chloride dropped. Last spring, it was down to 164 parts per million."

"I can tell you something else that shows the difference in the quality of our water. I'm in the air

conditioner business and out here in this dry country we use a lot of evaporative coolers. I service several every spring. Before 1964, I would find as much as an inch of dry salt in the bottom of the pans. Now I see very little salt. Five years ago, people had to change their air conditioner pads twice a year; now they last a couple of years."

Valley Creek heads 20 miles southeast of Sweetwater and flows through Taylor County into Runnels County, then through Lake Ballinger into the Colorado River. Before 1964, its 11,000-acre flood plain was under water periodically, causing damages averaging about \$131,000 annually. When the watershed project is completed, this is expected to be cut by nearly \$100,000 a year.

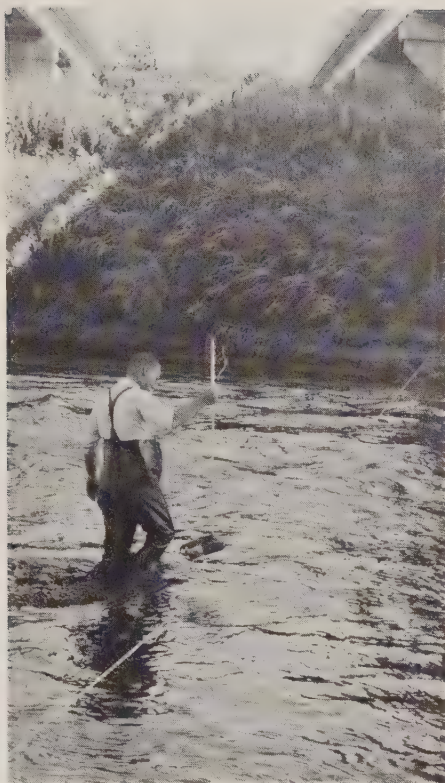
Project sponsors include the Valley Creek Water Control District and three soil and water conservation districts: The Upper Clear Fork, Middle Clear Fork, and Runnels. Three county commissioners' courts—Nolan, Taylor, and Runnels—are also sponsoring the work.

But the watershed job is not yet completed. There are five more dams to build, hundreds of acres of cropland still not getting proper conservation treatment, and grassland improvement work to do.

Even so, Valley Creek is running again. And Lake Ballinger is full of good water. ♦

Water has been flowing through the spillway (left) for more than a year, providing continuous fishing opportunity below the dam.





In the Washita River Project...

Effects of watershed treatment on streamflow

By Windell R. Shockey, Monroe A. Hartman, and Dolly R. Hunt

Agricultural research technician, research hydraulic engineer, and administrative officer, Agricultural Research Service, Chickasha, Okla.

Researcher collects sediment sample with hand-held device.

How does upstream flood control affect streamflow in watershed areas?

Such facts become more important each year to farmers, communities, and industries alike.

Finding the answer, by observing the flow of a river through varied land-resource and climatic regions within its basins, poses a complicated research problem.

The problem is further complicated by river water moving underground to the surrounding aquifer, or from the aquifer to the riverbed. This research resembles the problem of a man trying to determine how much water he can carry downhill in a leaky bucket if—

...he started with the bucket partly filled;

...more water was dumped in at several points en route;

...and water occasionally sloshed over the side.

The man needs an accurate measurement of the water he has at the end of the trip. In addition,

he must know the total amount of water that was in the bucket at any time during the trip, where it came from, and what happened to it.

Studies on the Washita River basin in Oklahoma and Texas seek to answer the question. The Washita River basin, one of 11 watersheds authorized by the Flood Control Act of 1944 for USDA sponsored watershed protection, is particularly well suited for research of this nature.

The authorized program, consisting primarily of land-treatment measures, such as pasture and range reseeding and improvement, crop rotation, land terracing, stream-channel improvement, and floodwater-retarding reservoirs, initiated in 1946 is now a continuing program by the Soil Conservation Service in cooperation with local landowners and operators.

Land use changes and conservation treatment have greatly altered the watershed in 30 years.

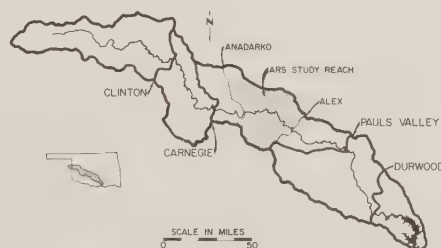
In 1930, 55 percent of the drainage area was in poor pasture; in 1960, 76 percent was in pasture, of which 70 percent was classified as "good." By 1965, 800 of the

1,200 planned flood-retarding structures had been built. In addition, Chickasha Lake, Fort Cobb Lake, and Foss Reservoir provide a combined conservation-storage capacity of 364,000 acre-feet.

The Agricultural Research Service started hydrologic research in 1961 on a 1,130-square-mile segment of the Washita River basin, with headquarters at the Southern Great Plains Watershed Research Center in Chickasha, Okla. The Soil Conservation Service, Oklahoma State University, University of Oklahoma Research Institute, Oklahoma Water Resources Board, Environmental Science Services Administration, and other federal, state, and local agencies cooperated in the research.

At the beginning, only nominal

Washita River basin.



Contribution from the Soil and Water Conservation Research Division, Agricultural Research Service, USDA, Chickasha, Okla., in cooperation with the Oklahoma Agricultural Experiment Station, Stillwater, Okla.



Concrete weir measures low flows on a small tributary of the Washita in central Oklahoma.

soil conservation practices had been applied in the study area, thus enabling researchers to record streamflow and channel behavior before and after application of intensive watershed protection and land-treatment measures.

Research planners recognized that watershed-improvement measures could affect more than just the waterflow in the river. Further, the Washita River research would need to yield methods for predicting the flow behavior of other rivers whose basins had been treated similarly. Comprehensive research objectives were adopted, therefore, to include:

(1) Determine how regulated flow resulting from combined land treatment and structural measures in tributary watersheds affect flood flows, annual and seasonal water yields, ground-water levels, stream-channel stability, and sediment movement along the main channel of the river.

(2) Analyze and interpret available data to determine what might have been the effect along the main stem with alternative treatment programs in the tributary watersheds.

(3) Develop hydrologic procedures for making similar estimates in other river basins.

(4) Develop conservation practices for better overall watershed performance.

An extensive hydrologic data-gathering system established in the

study area includes: A network of 225 recording rain gages, 30 stream-gaging and sediment-load stations operating continuously, 250 ground-water wells, six reservoir study areas, weather stations, and stations to observe soil moisture accretion and depletion.

Numerous stream channel cross sections and reaches have been surveyed and marked for observation and future reference. Geologic and soil maps have been prepared. Records of land use and locations of applied soil conservation practices are maintained. Records are also kept of water levels in stock ponds, floodwater-retarding structures, and other reservoirs. Results are still incomplete because the studies in the Washita basin are necessarily long-term, but some significant and interesting things have already been found.

For instance, studies in Sugar Creek watershed, a 203-square-mile tributary within the study area, indicated that flood peaks declined by 25 to 70 percent, depending upon storm size and patterns and number of floodwater-retarding reservoirs in operation.

One impressive finding thus far is the large volume of streamflow absorbed by the streambed and adjacent flood plains. About 28,000 acre-feet of water was absorbed in the 80-mile reach of river channel between Anadarko and Alex during the 10-day period in late Septem-

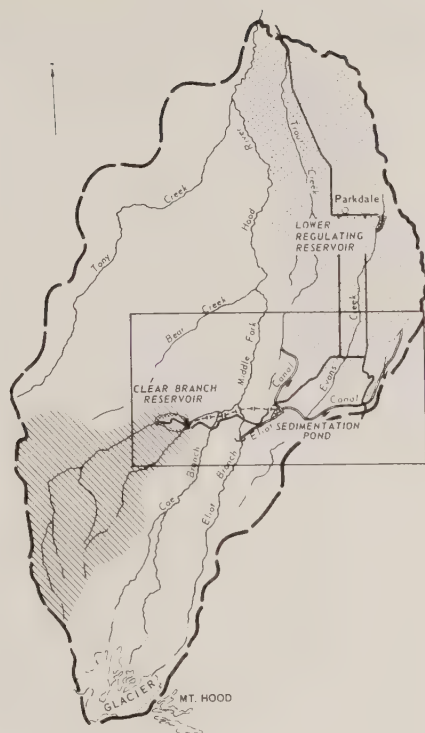
ber 1965. Information about such abstractions of streamflow are basic to an understanding of the downstream effects of treatment measures in upstream tributaries.

Thus, it does not follow automatically that water held on the land to increase crop production or to aid in stabilizing critical sediment-source areas reduces downstream water supplies. Under many climatic and geologic conditions, much of this water would have been absorbed in stream channels and added to ground water or dissipated by evaporation and phreatophytes. Elsewhere, of course, the reverse is true and water infiltrated upstream returns to sustain or increase tributary and riverflow downstream.

Land-treatment and flood-control measures in the Washita River watershed above Durwood, Okla., have reduced the volume of flow occurring at rates above 1,900 cubic feet per second (c.f.s.) and below 300 c.f.s. The volume of flow in the intermediate range (300 to 1,900 c.f.s.) has increased and offsets the reduction to the extent that the total volume of flow remains unaffected by land treatment.

Flow rates below 300 c.f.s. persist for 30 percent of the time for both the treated and untreated conditions of the watershed. Yet, the flow rates for the treated condition are much less during this time than for the untreated condition. Use of water for irrigation and increased use of water by industry probably have been a factor in reducing the flow rates in this 30-percent time period. These uses amount to 30 to 100 c.f.s. daily.

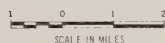
Flood frequency has also decreased at Durwood with change in land use and treatment. During this same period there has been no change in flood frequency on the nearby Kiamichi River where few land use changes have been made. Although large floods still occur after treatment, they occur less frequently. Instead of a 100,000-c.f.s. flood every 20 years, indications are that this size flood will occur only once in more than 100 years. ♦



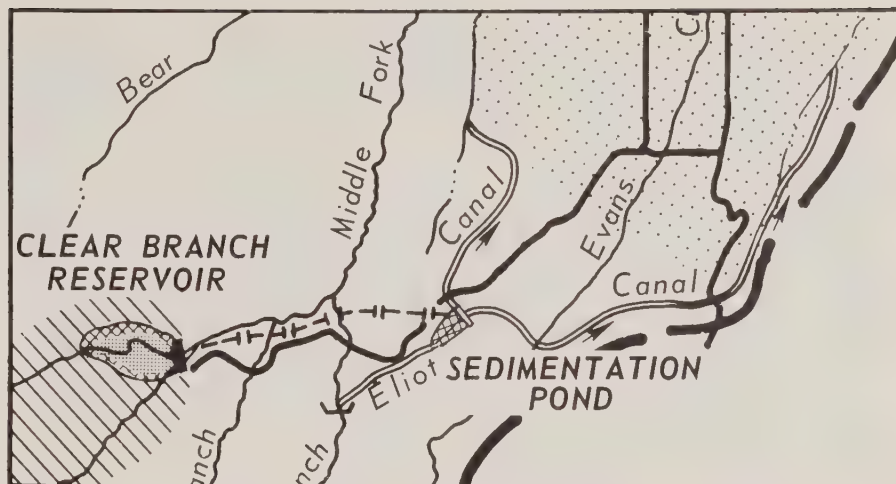
LEGEND

- Watershed Project Boundary
- Benefited Area
- Proposed Pipe Line
- Existing Irrigation Canal
- Proposed Multiple Purpose Reservoir
- Proposed Regulation Ponds
- Proposed New Diversion Structure
- Drainage Area of Reservoir

PROJECT MAP MIDDLE FORK OF HOOD RIVER WATERSHED HOOD RIVER COUNTY, OREGON



On Mt. Hood's northern slope, irrigation water flows down Clear Branch and Eliot Branch, into a sedimentation pond, and down the canals and to the valley orchards. Enlarged portion to right shows details of the primary water-control structures.



Clean water at last! . . .

Watershed project clears glacial debris from irrigation system

By W. H. Coffield

Watershed planning leader, SCS, Portland, Oreg.

Glaciers on the north slope of Oregon's Mt. Hood grind the underlying rock into abrasive "flour" and feed it into icy streams. When rains combine with snow-melt and summer glacier melt the swollen waters sweep tons of sand, gravel, and boulders into irrigation systems with heavy economic cost to farmers in the valley below.

For years—dating from the creation of their Middle Fork Irrigation District in 1917—fruit growers waged a losing battle against dirty water, while producing the famous Hood River apples and pears.

Today, clean water is flowing onto 8,000 acres of farms and orchards in the Upper Hood River Valley, because the newly completed Middle Fork of Hood River Watershed Project provides irrigation storage and control measures to clean or bypass dirty water.

Prior to the watershed project, irrigation water was diverted from Hood River's upper tributaries, less than 3 miles below the north glaciers. These streams were dependable and plentiful year-round, pre-

senting an ideal opportunity for summer irrigation.

Summer, however, brings warm temperatures, rainstorms, flash floods, and accelerated glacial movement. The effect on valley irrigation can be economically crippling. The tumbling streams carry boulders, sediment, and debris to batter control structures and foul the sprinkler irrigation systems.

The main diversion structures fill with debris at least twice a year, usually when irrigation needs are most critical. Coe Branch and Eliot Branch, the principal irrigation sources, were highly susceptible to these glacial outbursts and made economical irrigation in the valley practically impossible.

Even "quiet" glacial streams contain enough sand and silt to frustrate the use of sediment traps along the main canal. The traps must be flushed several times daily, causing interruptions in service, complications in bleeding unwanted air from waterlines, and damage to equipment from overflow sediment despite the best preventive efforts.



Snow-capped Mt. Hood towers over the newly completed Middle Fork Watershed Project, providing water to irrigate Oregon's famous Hood Valley orchards. The sedimentation pond in the foreground removes silt and sand before they can enter the irrigation system.

Highly abrasive under pressure, sediment rapidly scours valves, sprinkler heads, and pipelines, resulting in need for extensive repairs. Sheldon Laurance, former irrigation district chairman, reported that his annual repair cost exceeded \$25 an acre. Extended across the district, the damages have exceeded \$137,000. Regardless of the exact cost, sediment pollution made it economically impossible for the district to expand beyond its 6,000-acre production base.

In a move to find clean water for irrigation, leaders of the Middle Fork Irrigation District joined with the Hood River Soil and Water Conservation District in filing an

application for assistance under Public Law 566 in late 1958. The application was approved, the Soil Conservation Service helped the sponsors prepare a watershed plan, and construction got underway in 1963.

The primary features of the project are a multipurpose reservoir of 2,600 acre-feet capacity on Clear Branch, a diversion dam on Eliot Branch, and a sedimentation pond where waters from both streams are combined. Other measures include: One regulating reservoir, six pipeline intake diversion structures, more than 150,000 feet of distribution pipelines, and more than 4 miles of improved canal.

Water samples tell the story of the Middle Fork Watershed Project. Eliot Branch, left, carries heavy load of glacial debris. Center sample shows same water after settling, as in the sedimentation pond. Clear Branch, right, runs clean, providing excellent quality water for irrigation.



Though offering excellent water quality, Clear Branch by itself lacked sufficient quantity to meet the irrigation needs. Eliot Branch, a seasonally "dirty" glacial stream, could provide the balance needed, if sediment could be checked.

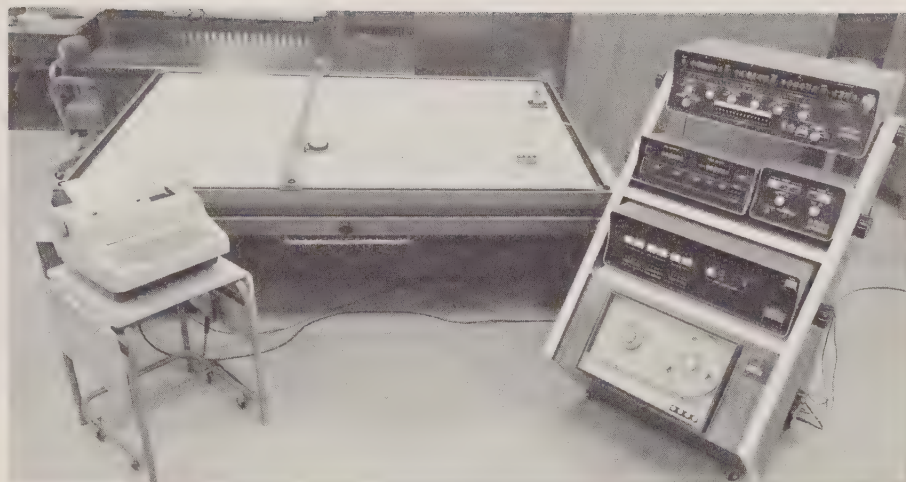
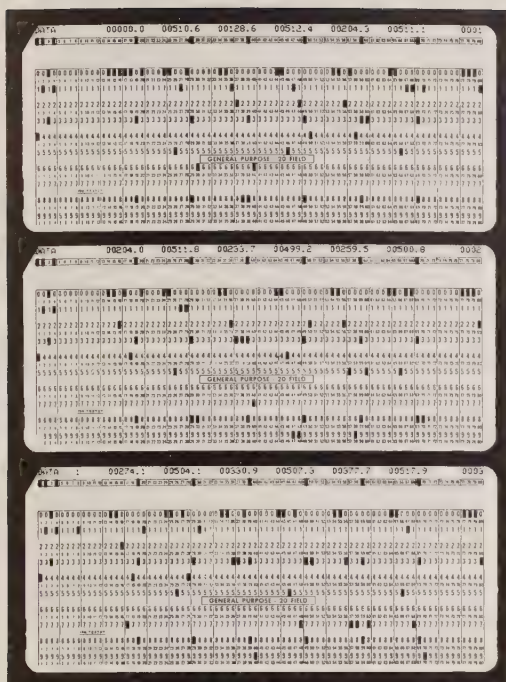
The result is a tandem-like system whereby the Clear Branch Reservoir stores relatively clean, though limited, water year-round. When needed, water is piped to the sedimentation pond, then transferred by canal and pipelines to the farms.

Eliot Branch adds substantially, except during glacial outbursts, when the irrigation district opens the diversion gates to allow the sediment-loaded stream to flow down its normal channel, instead of through the irrigation system. As the outburst subsides, Eliot Branch is again diverted into the sedimentation pond where glacial material can settle out.

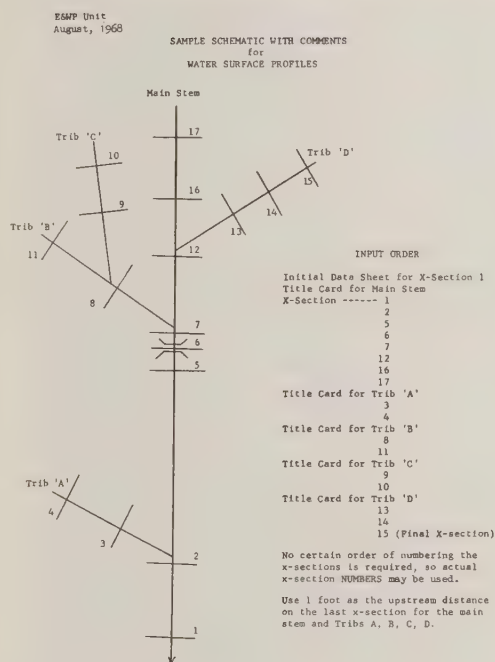
In this flexible combination of storage and control, Clear Branch and Eliot Branch now assure the district plenty of protection to keep equipment in working order and plenty of clean water to irrigate their original 6,000 acres and 2,000 additional acres.

The estimated benefit of the project structures is \$272,000 annually, compared to the cost of \$90,650—a three-to-one benefit-cost ratio. Public Law 566 funds paid for about 54 percent of the \$2.7 million installation costs.

Besides irrigation, Clear Branch Reservoir provides camping, fishing, and other recreation, in addition to fire protection for the Parkdale District. As a secondary benefit, the watershed project is expected to add nearly \$300,000 annually in increased area business. ♦



Above, a coordinatograph table is connected to the quantizer which feeds topographic data to the typewriter for printout. At left are examples of punch cards recording cross-section data determined by the stereoplotter and a sample layout of valley cross sections for hydrologic studies.



Maps the modern way

By Jerome A. Gockowski and J. T. Casey
Assistant director, Cartographic Division, SCS,
Washington, D.C., and head, Cartographic Unit,
SCS, Lincoln, Nebr.

Stereoplotters, computers, and aerial photography are the tools of the Soil Conservation Service's modern map-making service. The combination produces more and better topographic maps, quicker and cheaper, than traditional ground surveys with transit and plane table. Further, it produces related engineering data in a computer-oriented format.

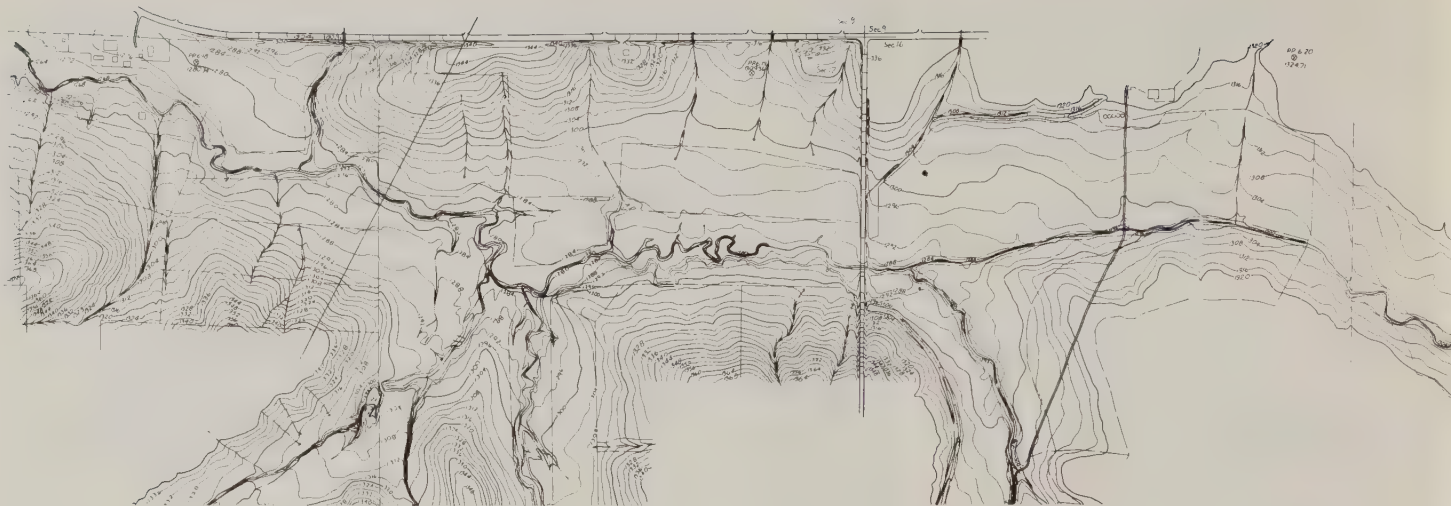
The Soil Conservation Service

through its cartographic centers provides a wide range of map, drafting, and reproduction services for field operations in farm and ranch conservation planning, watershed projects, engineering planning and design, soil survey maps, and the like.

Production of topographic maps, which show in detail the contours of the land's surface, has always been an important part of SCS map

work. For many years, an increasing portion of this type of mapping has been done by stereoplotting from aerial photographs taken specifically for the requirements of each job. In fiscal 1969, the volume of stereoplotting reached 146,718 acres.

Recently, SCS added Wild B-8 stereoplotters, equipment of advanced design, to the standard complement of Kelsh stereoplotters in



its cartographic units. The result has been increased production while maintaining standards of accuracy.

Most of the topographic mapping done to date has been for the planning and design of floodwater-retarding structures. The maps are used also to provide valley cross sections for calculating runoff at different flood stages, to supply topographic data for irrigation design and layout, and, more recently, for the design and layout of terrace systems.

Detail of topographic work has ranged all the way from maps having 10-foot contour intervals with 5-foot interpolated contours to highly accurate maps having 1-foot contour intervals and showing intermediate spot elevations at high and low points.

Use of stereoplottting equipment to produce topographic data reduces the required time of field people by about 75 percent. Also, the general accuracy of stereoplotted contours is better than that obtained by ground surveys, because this equipment plots contour lines continuously throughout their length.

While ground surveys are highly reliable in the vertical and horizontal location of observed points, the contour lines must be sketched by estimation between these points. The stereoplotters also locate interpolated contours with relation to the ground rather than proportioning them between other contours.

Once the aerial photography has been obtained and the ground control established, the topographic maps can be plotted by machine by day or night, in summer or winter, as needed.

The total cost of obtaining topographic maps by stereoplottting is 40 to 50 percent less than by manual methods. The cost includes aerial photography, ground control, and stereoplottting in the cartographic unit.

This class of work requires advance planning and close coordination between field offices and the cartographic units. Consideration must be given to many interrelated factors in planning each project. Among these are the use to be made of the data; location, size, and priorities of areas to be mapped; contour intervals required and ground work needed; flying season; and costs.

Advances in photogrammetric mapping, including the use of electronic aids, have made it possible to keep pace with SCS's increasing engineering workload without an equivalent increase in manpower. At the same time, they have improved the accuracy of topographic mapping and increased the availability of other forms to topographic data by substituting machine time for manpower.

Soil Conservation Service cartographers have been working closely with other agencies and companies

that are also developing advanced mapping systems. Equipment has now been adapted to SCS stereoplotters which will calculate data needed by field engineers while plotting topography, thereby releasing engineers for the more highly professional aspects of their duties.

Two of these advanced systems, both involving quantizers manufactured by the H. Dell Foster Company, have been installed, one at the Hyattsville Cartographic Unit in Maryland and the other at the Lincoln Cartographic Unit in Nebraska. The quantizer is interfaced with the stereoplottting machine so that the X, Y, and Z coordinates of every point along a plotted line are recorded as the plotting progresses.

When the field engineer submits a structure site to the cartographic unit for plotting he may not be certain of the structure site location. He may indicate two or three tentative locations.

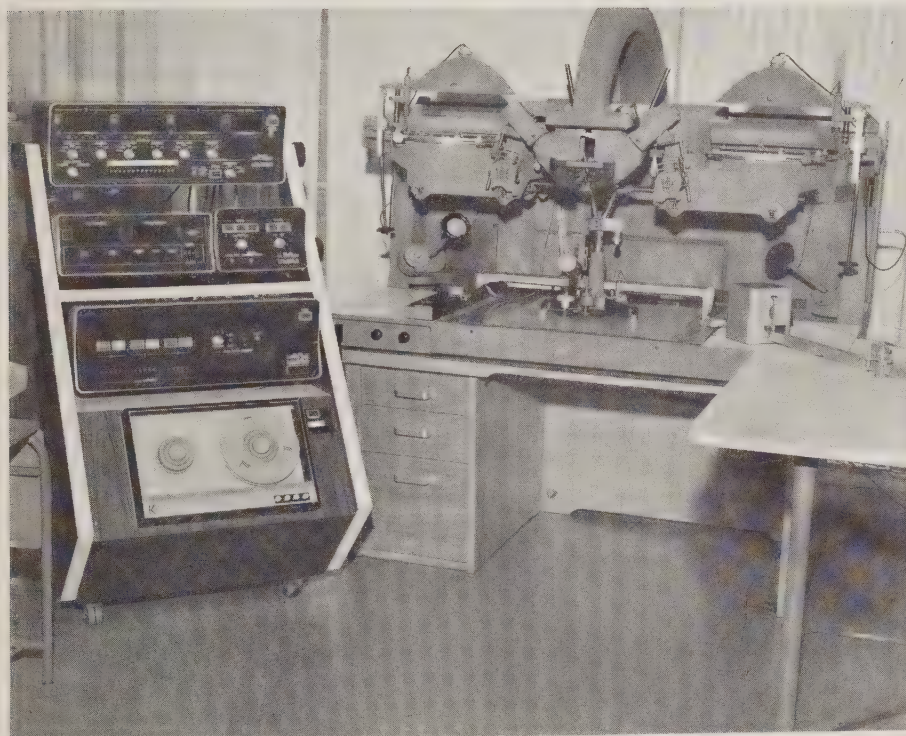
This combination of equipment enables the cartographer to give the field engineer comparative data on several tentative structure sites as a byproduct of plotting the topography of the watershed. As successive contours are drawn, the quantizer obtains the area within each individual contour at each site and computes the storage volume in acre-feet, or whatever unit of measure is required, within each contour increment.

A typewriter attached to the

ELEV. FEET	AREA ACRES	VOL. ACC. AC/FT
1272	0000 13	
1274	0000 00	0000 28
1276	0000 72	
1278	0000 00	0003 64
1280	0003 64	
1282	0000 00	0017 72
1284	0013 58	
1286	0000 00	0072 04
1288	0028 86	
1290	0000 00	0187 48
1292	0046 31	
1294	0000 00	0372 68
1296	0065 65	
1298	0000 00	0635 32
1300	0088 40	
1302	0000 00	0988 92
1304	0118 37	
1306	0000 00	1462 36
1308	0149 42	
1310	0000 00	2060 04
1312	0184 10	2428 24



A portion of a watershed contour map (left) produced by the stereoplotter and printout (right) of stage-storage data derived from it.



quantizer produces a printout of area and storage volume data in the format used by field engineers. Or, if the digital data are to be used in computers elsewhere, they are recorded on punch cards or magnetic tape.

Valley cross sections can also be obtained by use of the stereoplotter-quantizer-typewriter as a printout at the time of plotting to provide a

complete series of cross sections within an evaluation reach of a stream for watershed operations. With water-surface profiles on IBM punch cards, the hydrologist needs only to add the friction factors ("n" values) and other observed variables to derive his complete hydraulic solution by use of computer programs.

Should the volume of fill in struc-

ture sites at various elevations be required, the engineer supplies the cartographic unit with the proposed top widths, side slopes, and the crest elevations. The cartographic unit then can provide the volume for any specific elevation or series of elevations. Thus, when the topographic map is returned to the field, it is accompanied by stage-storage data above tentative sites, volume of fill, and valley cross sections.

The cost of this equipment precludes having a complete quantizer attached to every plotting machine. Instead, the system is connected to a coordinatograph table by a switch that makes it possible to time-share the coordinatograph with the Wild or Kelsh stereoplotter. Areas and volumes can be obtained through the quantizer from topographic maps which have been plotted previously in about 25 percent of the time required by procedures in the field. In addition, the data from the coordinatograph table or from the plotter can be stored on magnetic tape or punch cards for future recall in the design of structures, the rating of valley cross sections, and other engineering functions.

This equipment is a basic unit. Additional compatible equipment can be obtained at a later date. This feature makes possible unique performance not available with other existing electronic systems. For example, data can be recorded on magnetic tape that will later drive an automatic drafting machine to produce properly scaled topographic maps as required for field use. In another application, the coordinatograph table can be used to quantize data to digital form from soil survey field sheets and record the information on magnetic tape so it can be used in an IBM 360/65 computer to generate another magnetic tape that will drive an automatic drafting machine producing press-ready negatives of soil maps.

These advancements in topographic map and data production make it possible to provide more cartographic services to the field at less total cost. ♦

Gilbert Run Project nears completion in southern Maryland

By David K. Bowen

Assistant state conservationist, SCS, College Park, Md.

After 15 years of steady progress in watershed planning and flood prevention, southern Marylanders plan to put the finishing touches on the Gilbert Run Watershed Project this year.

Construction on the three water-impoundment structures, located 30 miles south of Washington, D.C., in Charles County, was completed in 1968. Now, local sponsors are commencing a 9-mile channel-improvement project to restore Gilbert Run's original streamflow capacity, long since seriously reduced by sedimentation as a result of two centuries of farming the watershed uplands.

The total effort brings effective flood control, increased recreation, and improved opportunities for further resource conservation to the area.

In 1955, the Charles County Commissioners and the Charles Soil Conservation District applied for assistance under Public Law 566 to

help solve a flooding problem in the Gilbert Run watershed. Watershed specialists helped local sponsors draw up a work plan that was approved for operations in 1959, and local residents organized the Gilbert Run Public Watershed Association.

Gilbert Run is a tributary of the Wicomico River, a tidewater stream emptying into the Potomac estuary. Much of the flood plain above the tidal swamps near the stream's mouth have been cultivated from colonial times. Like many other tidewater streams, Gilbert Run was soon choked by sediment carried down from tobacco and corn fields. Stormflows then spread out over the bottom lands, with increasing frequency, forcing many fields to be abandoned and causing a recurring problem on the others.

The original watershed work plan called for three reservoirs to hold back floodwaters and sediment from the uplands plus restoration

of the channel to enable it to carry the regulated flow from the flood-water-retarding dams. A supplemental plan in 1965 added recreational water storage and facilities at one impoundment.

Besides the structures, the watershed improvement project includes land-treatment measures consisting of grass seeding, reforestation, pasture improvement, contour farming, and other cropping practices to reduce sedimentation of the reservoirs and new channel.

All of the flood-plain land is in private ownership except road rights-of-way. In addition to protecting the farmland, the project will prevent flooding of the roads and reduce bridge maintenance.

Already, the reservoirs and land treatment are stabilizing the stream-flow by holding back floodwater and releasing it during dry periods. The Jameson Reservoir, near the headwaters of the stream, holds about 86 million gallons of water in the pool reserved for sediment storage. During a summer drought in 1966, about 11 million gallons of this water was released in a 23-day period to keep the stream flowing and preserve the fishery. The Trinity Reservoir, located on a lefthand tributary that enters the main stream about half-way down the watershed, contributed another 35 million gallons a day during a 35-day period.

The regulated release of water to sustain fish and wildlife during the drought earned the Gilbert Run Public Watershed Association the 1966 award as "Conservation Organization of the Year" given by the Maryland Wildlife Federation in cooperation with the National Wildlife Federation and the Sears Roebuck Foundation.

Measures to protect wildlife are included in plans and contracts for construction of the final phase of the project. The channel slopes will be seeded during construction and the other disturbed areas soon afterward to reduce sediment damage to

Jameson Reservoir is the uppermost of Gilbert Run's three impoundments.



the stream. A section of the channel toward its lower end will be enlarged to allow settling of sediment before it reaches the Wicomico River. The three existing impoundments are trapping about 90 percent of the eroded material reaching them from the watershed above.

In further interest of fish life, the contract requires that excavation along the lower reach of the stream be discontinued during the anadro-

mous fish run from mid-March to June 1. On recommendation of the Maryland Department of Game and Inland Fish and the Department of Chesapeake Bay Affairs, the sponsors are negotiating with private landowners for modifications in the channel to enhance its use by anadromous fish and to hold water in some of the oxbows of the old channel which the new channel will bypass. ♦

Pollution control, water supply combined in project plan

By Floyd L. Wiles and Jesse L. Hicks

Forester, U.S. Forest Service, Morgantown, W. Va., and assistant state conservationist, SCS, Columbus, Ohio.

The people of three south-central Ohio counties are looking to a small watershed project to solve a problem of severe water pollution caused by erosion and raw sewage.

The 117,800-acre Pine Creek Project under Public Law 566 also provides new hope for the economic future of Jackson, Lawrence, and Scioto counties.

"Plenty of clean water is essential to the future development of this region," says Marion Edmundson, chairman of the board of directors of the Pine Creek Conservancy District. "By using multipurpose reservoirs, we expect to provide the needed water supply and increase recreation facilities while controlling floods."

Some small towns and villages, such as South Webster, Wheelersburg, and Ironton, need a water supply for future growth and expansion. Many of the municipalities in the watershed face water-quality problems. Recreation facilities are inadequate. Wells in the rural areas do not meet the needs.

The plan for the project provides for watershed protection, flood prevention, municipal and irrigation water supply, recreation development, and a land-treatment pro-

gram. It includes seven single-purpose flood-control structures, two multipurpose reservoirs providing storage for water supply, and two multipurpose reservoirs to be developed for recreation. Land-treatment measures include conservation treatment of 18,255 acres of forest land and 11,505 acres of cropland, grassland, and other land; 25 acres of strip-mined area rehabilitation; and erosion control along 5 miles of road. Construction began in August 1969 shortly after Congress approved the plan.

The structures are planned to reduce the average annual floodwater damages by 71 percent, benefiting 265 farms in the area. Eighteen miles of highway, 6 miles of railroad, 32 houses, and two commercial firms will receive significant protection. Average annual reduction in damage to the total watershed will amount to an estimated \$125,000.

Sources of stream pollution identified in formulating the plan included 220 outside toilets, seven trash dumps, and minor acid mine drainage on three tributaries. Many of the outside toilets have already been eliminated by the forest land acquisition program of the U.S.

Forest Service. The remaining toilets will either be eliminated by the purchase of land by the Forest Service or will be enjoined from use by the county health board. The seven trash or refuse dumps will be eliminated by the county commissioners, township trustees, and the Forest Service.

Land-treatment measures applied by landowners in cooperation with the soil and water conservation districts will reduce pollution of streams by sediment. Forest land-treatment measures on private land will be installed by the landowners with technical assistance from the Ohio Department of Natural Resources in cooperation with the Forest Service. The Ohio Department of Natural Resources will install land-treatment measures on the Dean State Forest and the Forest Service on the Wayne National Forest. Educational assistance will be provided by the Cooperative Extension Service.

Two reservoirs will be developed for recreation. An area of 860 acres will be developed for public use around one recreation pool of 583 acres. Facilities will include 800 feet of beach with bathhouse, two boat launching ramps, a family campground of 150 sites, and group facilities for 300 people with complete water and sewage systems.

The Forest Service will administer the public recreation area and will supplement it by improvements in wildlife habitat on National Forest land in the watershed.

The \$8,414,265 cost of the project will be shared by the Soil Conservation Service in the amount of \$3,457,331; the Forest Service, \$3,044,152; and local sponsors, \$1,912,782.

Appraisal work has started with funds from the Ohio Department of Natural Resources revolving fund in the form of a loan of \$55,000. The directors of the conservancy district have filed an application with the Farmers Home Administration for a loan for construction and development of the water-supply portion of the plan. ♦

New Mexico rancher shifts wornout farms to grassland

New Mexico

The 300-year-old Spanish ruins of Gran Quivira Mission, south of Mountainair, N. Mex., testify grimly of a civilization destroyed by uncontrollable forces—chiefly drought.

Fifteen miles away, the farming town of Claunch, N. Mex., is fading quietly away, leaving no monuments to compare with Gran Quivira, nor even the subsequent scars caused from cropping nonarable land.

D. H. (Doc) Dean and his wife Charlene own 23 sections of Claunch ranchland. The Deans moved to Claunch in 1942 and began acquiring land in piecemeal fashion. Their ranch eventually contained some 1,300 acres of cropland and even more acreage in wornout farmland.

Under cultivation, the sandy soils could produce good yields, but erratic rainfall and high winds caused many crop failures and severe erosion. Dean bought these fields and seeded them to improved native grasses, out-producing the adjacent range that was never cultivated.

In 1961, Dean developed a conservation-treatment plan for his ranch through the Great Plains Conservation Program. The plan provided for federally cost-shared conversion of all cropland to rangeland and the construction of three livestock ponds, installation of 3 miles of livestock water pipelines, brush control on 845 acres of pinion-juniper range, and building more than 6 miles of cross fences for better distribution of livestock. These treatments required an expenditure in excess of \$50,000. Dean also applied several other practices that were not cost-shared.

To illustrate the difficulty in re-vegetating sandy cropland, Dean points to a 2,000-acre tract that he acquired in 1966. Establishing grass

there requires a dead litter cover, so the new owner sowed 1,400 acres to rye but lost half to poor seasonal moisture and lack of topsoil. A year later, the bare half was again drilled to rye, this time under good weather conditions, but grasshoppers and rabbits practically ruined the cover.

Finally, in 1968, blue grama and sideoats grama were drilled in the rye residue, and all but 10 to 15 percent appears to be established. Under normal conditions, it will be 2 or 3 years before normal grazing is permitted. Altogether, the project will require 7 years of expensive, and patient, rehabilitation.

Unlike the builders of Gran Quivira, Rancher Dean has created a living monument to wise land use, and his efforts stand as examples for others to follow.—MORRIS WILLIAMS, assistant state resource conservationist, SCS, Albuquerque, New Mexico.

Kentucky

Banker invests time, money in wildlife habitat

In addition to his responsibilities as a member of the local district board and city planning commission, a Prestonburg banker manages one of the finest and largest wildlife habitat developments in the mountains of eastern Kentucky.

H. D. "Buddy" Fitzpatrick, Jr., has set aside approximately 80 of his 650 acres in the Floyd County Soil and Water Conservation District. The rest of the farm is in woodland, pasture, and hayland.

In 1969 Fitzpatrick improved 38 acres of habitat in a small valley below the large timber line. The area included 7 acres of food plots and brush piles left for cover in open areas on bottom land. Five acres was seeded to orchardgrass and



Rancher D. H. Dean (right, above) and SCS conservationist Morris Williams survey a former beanfield that has been restored to native grass. Wind erosion delayed for 2 years the grama-grass planting below.



Remains of old barn on former farmland.



whiteclover mixture for rabbits, quail, grouse, and deer. The vegetation not only provides food but also attracts insects which the animals eat. Fitzpatrick seeded wheat and hairy vetch in other areas and found vetch to be particularly effective cover for smaller animals.

On the mountainside at the edge of heavy timber he cut a 20-foot strip where plant cover will gradually develop through natural succession. The strip allows grouse and deer to feed in open space close to good cover. Brush cleared from the area and stacked along the lower edge of the lane supplements standing cover.

Fitzpatrick has also completed 8,400 feet of stream channel improvement on the Left Fork of Middle Creek and the main branch of the same stream. He has renovated many acres of pasture. Recently, he installed a 5,879-foot underground tile drainage system.

Encouraged by the success of his efforts, Fitzpatrick plans to develop more wildlife areas, improve woodland, and seal several more ponds. —JIMMIE R. CHILDERS, *district conservationist, SCS, Prestonburg, Ky.*

Florida

Thoroughbred conservation on horse farms

Where thoroughbreds thrive on bahiagrass instead of bluegrass, soil conservation practices are being added to normal operations.

Of the nearly 150 horse farms in north central Florida around Ocala, several have already received as-

sistance from SCS and the Marion County Soil and Water Conservation District.

At Dorchester Equine Preparatory School—home of Carry Back—erosion on exercise paths brought owner-operator Jack Price to the district. It was recommended that areas be seeded with bahiagrass, mulched, and not used until the grass had been reestablished. Price plans to train colts for steeplechasing, so the grass had to be particularly tough.

At nearby Tartan Farms, all 600 acres are under a conservation plan. Manager John Hartegan developed a 4-acre pond with district assistance and installed tile drains to cure a damp spot in one of the paddocks. He also put in an underground livestock watering system.

One of the three ponds stocked with bream and bass at Hobeau Farms is a beautiful lake in the infield of the mile training track. With some guidance from the district, Elmer Hubeck manages resources for prize stallion Beau Gar and other horses. SCS gave assistance during the construction of an embankment-type pond at Hobeau Farms. The district was also asked to do the surveys for the development of a lake at Hubeck's own farm, Quail Roost. —HARVEY C. RATHEL, *district conservationist, SCS, Ocala, Fla.*

Arizona

Citrus grower saves water with irrigation system

Among practitioners of good water management, Art Bodine is a

leading light. He is his own worst critic, especially concerning what he calls his own short-sightedness.

If he had known in 1944 what he knows now, he says, he would have been using 40 percent less water during the past 25 years on his 1,800 acres of citrus orchards in Deer Valley north of Peoria, Ariz.

In 1944, Bodine became a cooperator with the Agua Fria-New River Soil Conservation District, and SCS conservationists and engineers began assisting him in a land-leveling operation while advocating the feasibility of improved water-management practices.

He now has a conservation irrigation system installed on 500 acres, with runs 660 to 880 feet long having a fall of 0.2 to 0.3 foot in their total length. On this land there is no wasted runoff and he irrigates with 40 percent less water than is required on the remainder of his orchard. —MARVIN SKOUSEN, *soil conservationist, SCS, Phoenix, Ariz.*

Maine

Soil survey prompts successful family garden

A soil survey, a small garden, and a roadside stand have brought new jobs and income to the Bushey family in the little town of Princeton, Maine.

Mrs. Eleanor Bushey, her six children, and their semiretired uncle, Frank Bailey, began to cash in on the promising characteristics of 3 acres of good soil after a survey was done by the Washington County Soil and Water Conservation District.

Training track, infield lake, and island at Hobeau Farm.



Art Bodine's citrus grove under conservation irrigation.





Lake for day campers (left). SCS Soil Scientist William Meade instructs Boy Scouts at Camp Cherokee.

Following a conservation plan prepared for Bailey's 8 acres, the industrious family set 1,000 strawberry plants in the spring of 1968. Slow growth caused by a dry season prompted the construction of a ¼-acre multiple purpose pond later that summer. A borrowed bulldozer and cost-sharing through the Agricultural Conservation Program were used to make the most of a brook that crossed the property.

During the 1969 growing season, a portable pump and garden sprinklers brought ample water from the pond to the strawberries. The children swam and fished in the pond that had been stocked with brook trout. The irrigated fields yielded 2,650 quarts of berries that brought almost \$1,770 gross income at the family's roadside stand. Sweet corn, potatoes, gladioli, and tomatoes were also raised and sold by the enterprising youngsters.

In addition, the Busheys planted pinto beans from the surplus food program and stored them for the winter—in effect, making the soil a year-round source of support.—DONALD HARRIS, *district conservationist, SCS, Machias, Maine.*

New York

Lake adds to success of rural day camp

"The lake has been of tremendous interest to the children," said Dr. Jesse Kaye, owner of a day camp near Albany, N.Y.

The 4-acre lake was constructed as part of his conservation and rec-

reation plan as a cooperator with the Albany County Soil and Water Conservation District.

The Kayes had decided that a high dry knoll on their property would provide good play areas for the operation of a day camp. A short diversion ditch to catch seepage and runoff water and feed the pond was constructed. The owners were impressed by the fact that their lake is filled solely by runoff water from their own watershed.

To protect and beautify the area, the Kayes planted trees on several acres of sloping abandoned hayfields. Today there is a fine spruce and pine plantation taking shape.

Last summer 240 children were enrolled in the day camp.

"We feel that the lake definitely aids us in attracting better qualified personnel and more customers," Dr. Kaye comments. "We have been able to expand our water facilities and add canoeing and sailing to our day camp program."—FRANK E. LEAVITT, *district conservationist, SCS, Delmar, N.Y.*

Texas

Boy Scouts learn conservation at camp

"We want it rustic and rugged," said the director of the Circle 10 Boy Scout Reservation, describing a conservation plan developed in August 1966 with the Trinity-Neches Soil and Water Conservation District for Camp Cherokee near Athens, Tex.

Camp Cherokee, which serves

large numbers of Scouts from the Dallas-Fort Worth area, is comprised of some 3,500 acres of small farms and former cropland interspersed with beautifully wooded hills and grassed valley. More than 80,000 pine seedlings have been planted on the former fields, and Coastal bermudagrass has been sodded on areas of heavy activity—all by Scouts under supervision of professional conservationists.

The North Central Texas Chapter of the Soil Conservation Society of America (SCSA) selected Camp Cherokee as its 1969 project, providing instruction in resource conservation and development for some 1,500 summer campers.

SCSA members met with Scout sponsors prior to summer camp and set up Scout conservation work on such practices as mulching, bermudagrass sodding, watering, mowing, fertilizing grasses, and constructing miniature dams.

Instructors emphasized proper development of wildlife habitat, removal of undesirable brush and weeds, and care of seedlings. As part of their nature study, Scouts collected, identified, and mounted some 85 native plants.

SCSA instructors, which included area and district conservationists, soil scientists, and forestry and pasture specialists, held half-day sessions with the Scouts once a week for 5 weeks, discussing pollution, wildlife, soil, water, forestry, and other areas of resource conservation.—HUBERT H. MOON, *soil conservationist, SCS, Athens, Tex.*

Unirrigated corners become multiple use recreation area

A Kansas irrigator turns wasteland, not reached by circular sprinklers, into a combined wildlife, recreation, and wind-erosion control area with the help of local people and state and federal agencies.

Roger Ramsey raises irrigated corn on 160 acres near Garden City. A person flying over the area in the summer sees large round green checkers on a gray-green checkerboard. The green circles are areas of lush corn being irrigated with circular sprinkler systems. Since the sprinklers rotate around a central point of a 160-acre square, with the irrigation water falling within the circle, there are about 25 acres left dry in the four corners. Where the soil is sandy and droughty, the corners grow sagebrush and yucca.

But Roger Ramsey is doing something unusual and practical with the dryland.

In 1968 he presented to several agencies his idea of setting out trees and shrubs to create a wildlife, recreation, and wind-control area in this wasteland. The proposal grew into a community cooperative project when the Finney County Parks, Fish, and Game Association generated interest with a dinner that featured a variety of wild game meat and a talk on wildlife and forestry conservation by the local game warden.

Members and sons of the sportsmen's club, Boy Scouts, 4-H Club members, and Ramsey and his sons spent 2 days planting some 4,000 trees and shrubs.

A circular windbreak, made up of a row of Russian olive, two rows

of redcedar, and a row of Nanking cherry, will be stocked with quail. Other small game and nongame animals will come naturally into the area as it becomes a favorable wildlife habitat.

To supplement precipitation, the irrigation will provide moisture to the trees in the perimeter. Snow is expected to accumulate against the trees and shrubs, adding further moisture.

Plans are for the sportsmen's club to maintain the wildlife and recreation area and build a clubhouse in one corner. Ramsey plans a fishing reservoir for the opposite corner.

Technical help in planning the project was given by the Soil Conservation Service through the Finney County Soil Conservation District; by the extension forester; and by the Kansas Forestry, Fish, and Game Commission. The Agricultural Conservation and Stabilization Service provided cost-sharing.

Ramsey and the sportsmen look on the project as having many benefits.—ROBERT H. FULLER, *district conservationist, SCS, Garden City, Kans.* ♦

Watershed symposium to be held in August

A symposium on the theme, "Interdisciplinary Aspects of Watershed Management," will be held at Montana State University, Bozeman, August 3-6. It is being sponsored jointly by the American Society of Civil Engineers, American Society of Agricultural Engineers, and Montana State University.

Besides an opening keynote session, plans call for a banquet the first evening plus five half-day programs on the following subjects: Water quantity, water quality, flood and erosion management, vegetative management, and wildlife and recreation management. Additional information may be obtained from Dr. Glen F. Martin, Department of Civil Engineering, Montana State University, Bozeman, Mont. 59715. ♦

Scout Charles Graber holds a young cedar tree planted as part of a 4-row windbreak around corn grown with a circular irrigation system, while (left to right) Scout Executive Charles A. Pearson, SCS Conservationist Fuller, and Tom Walker, president of Finney County Parks, Fish, and Game Association, look on.



Meetings . . .

Water Works body studies environmental health

A theme of international scope, "World and Water Imperatives," awaits participants in the 90th annual conference of the American Water Works Association, Inc., in Washington, D.C., June 21-26.

"Population Explosion," "World-City of the Future," and "Water Supply and Environmental Health" will be the subjects discussed in the general session.

The conference will include 28 sessions. The Resources Division will consider topics on water reuse and regional, national, and overseas programs; the Management Division, among others, the role of the Federal Government in water supply and combined water and wastewater operations.

Watershed Congress assesses program

The 17th National Watershed Congress to be held in Denver, Colo., June 7-10, will present as its theme "Assessing the Watershed Program—1970." Divided into four sessions, the technical program will deal with fish and wildlife, water, land, and the forest assessments.

The feature of the banquet on the final night will be presentation of the 1970 awards for the watershed-of-the-year and honoring the watershed man-of-the-year. A motion picture documentary of Brush Creek Watershed of Mercer County, W. Va., the 1969 Watershed of the Year, will be shown.

Education Conference on the environment

The 34th Annual Educational Conference on the Environment will be conducted by the National Environmental Health Association in

Las Vegas, Nev., June 21-26.

A round table and panels will consider such topics as air pollution, housing and urban development, solid waste disposal, and training for environmental control.

Such distinguished ecologists and scientists as Dr. Lamont Cole, professor of Ecology, Cornell University, and Dr. Stanley Cain, chairman, School of Natural Resources, University of Michigan, will speak. Craig Palmer of the United Press International asks, "Is the environmental issue a fad, or bandwagon issue?" in his speech on "Environment and the Press."

Women's Club's target is clean environment

More than 2,000 delegates from every state in the Nation, plus those from clubs in 54 foreign countries will participate in the General Federation of Women's Clubs' 79th annual convention to take place in San Antonio, Tex., June 7-12.

The interest of clubwomen in conservation, which began in 1898 will be furthered at this convention. Of 10 resolutions to be voted on by the delegate body, five are concerned with aspects of this subject; namely, "Use and Control of Chemical Pesticides," "National Forests Jurisdiction," "Water Crisis," "Wilderness," and "Clean Environment."

Resolutions adopted form the policy of the General Federation and serve as the basis for action on projects by member clubs at the community level.

Seed Association meets to discuss changes in laws

Lake Tahoe, Nev., will be the setting for the 8th annual convention of the American Seed Trade Association on June 29 to July 2.

Most of the work will be done in division and committee meetings. The Soil Conservation Service is represented on the Conservation Committee of the Farm Seed Division.

The purposes of the association include participating in the drafting of amendments to the Recommended Uniform State Seed Law; evaluating proposed amendments to the Federal Seed Act, tariffs, and weights and measures laws; developing statistical information to aid USDA; and maintaining close liaison with seed-testing authorities.

Air Pollution body works to implement standards

The 63d. annual meeting of the Air Pollution Control Association will take place in St. Louis, Mo., on June 14-18.

About 150 papers will include the problems of motor vehicle exhaust, surveys of air pollution problems, and solutions that have been adopted by the process industries. Two plenary sessions will be devoted to the implementation of air pollution standards and national emission standards.

Dates and places

June 7-10, National Watershed Congress, Denver, Colo.

7-12, General Federation of Women's Clubs, San Antonio, Tex.

14-18, Air Pollution Control Association, St. Louis, Mo.

15-19, American Water Resources Association, Urbana, Ill.

20-26, Outdoor Writers Association of America, Inc., Coeur d'Alene, Idaho.

21-25, The American Institute of Architects, Boston, Mass.

21-26, American Water Works Association—National Symposium on Hydrobiology, Washington, D.C.

29-July 2, American Seed Trade Association, Lake Tahoe, Nev.

30-July 2, Federal and State Water Officials, Charleston, S.C.

July

1-6, National Education Association, San Francisco, Calif.

8-10, American Society of Agricultural Engineers, Minneapolis, Minn.

8-10, Izaak Walton League of America, Norfolk, Va.

18-22, American Association of Nurserymen, Inc., San Francisco, Calif.

19-23, National Federation of Business and Professional Women's Club, Inc., Honolulu, Hawaii.

26-29, National Association of Counties, Atlanta, Ga.

30-31, Great Plains Agricultural Council, Albuquerque, New Mex. ♦

Urban flood-plain management

Flood Plain Management: Iowa's Experience. EDITED BY MERWIN D. DOUGAL. 1969. *Iowa State University Press, Ames.* 270 pp., illus. \$6.95.

This volume brings together some 21 papers given at the sixth annual Water Resources Design Conference at Iowa State University. It provides a comprehensive inventory of the problems and potentials being encountered in flood-plain management.

The 21 papers are authored by state and national leaders in numerous disciplines, such as engineering, hydrology, law, urban planning, private consultants, landscape architecture, researchers, technicians of the water and weather agencies, and others.

Each of the seven chapters covers a specific aspect of the subject and in total they cover many problems associated with the planning and installing of action programs for attaining optimum and wise use of flood plains.

Although the primary emphasis is on the flood-plain management experience in Iowa, some attention is given to other areas, particularly, the Tennessee Valley and Lincoln, Nebr. Most of the techniques of flood-plain management outlined are equally applicable to other areas of the Nation.

The major concern of the book is with the regulation of flood-plain use to prevent additional flood problems, rather than with structural works to prevent or control floods. It does, however, consider structural flood-control measures and their place in a balance program for flood-plain management.

The papers give little attention to flood-plain management in rural areas, where flood losses pose an equally serious problem. These areas should also receive attention in any balanced national program for total flood-plain management.—

ERWIN C. FORD, *Watershed Planning Division, SCS, Washington, D.C.*

New publications

A New Life for the Country. 1970. *The Report of the President's Task Force on Rural Development (U.S. Government Printing Office).* 51 pp. \$0.35. Some of the many topics treated in this report include the need for rural development and for a national policy on the geographic distribution of population and economic growth. The task force emphasized the need for codifying existing statutes and evaluating the present federal programs that apply to rural development. The report encourages closer partnership between local, state, and federal governments and private industry for rural economic and social development. Expanding educational opportunity in rural areas, upgrading housing and health care, and accelerating the development of land and water resources are other major topics.

Conservation Highlights, 1969. 1970. *USDA Soil Conservation Service.* 6 pp. This folder presents a digest of the progress report of the many activities of the Soil Conservation Service for the fiscal year 1969. Data are given on outdoor recreation, community services, watershed-protection and flood-prevention projects, conservation districts, the Great Plains Conservation Program, conservation needs inventory, land-treatment progress, Resource Conservation and Development projects, snow and soil surveys, river-basin planning, and international activities.

Surveying Our Public Lands. 1969. *U.S. Dept. Int., Bureau of Land Management.* 16 pp., illus. \$0.15. Describes geodetic surveys, topographic surveys, and cadastral surveys and tells how surveying of more than 477 million acres of public land in the U.S. is done and the personnel and equipment used to conduct the surveys.

Fact Book of U.S. Agriculture. Rev. 1970. *USDA Misc. Publ. 1063.* 82 pp. \$0.45. USDA's only narrative summary of U.S. agriculture as a whole contains selected basic information on agricultural resources, production, finance, marketing, and rural United States.

Urbanization of Land in the Western States. BY HENRY W. DILL, JR., AND ROBERT C. OTTE. 1970. *USDA ERS-*

428. 30 pp., illus. Great amounts of land were urbanized in the Western United States during 1950-60. More than 71 percent went to dense residential use, 13 percent to open residential use, and smaller percentages to commercial, industrial, recreational, and airport uses. Some 75 percent of the land urbanized had been in cropland and less than 20 percent in pasture and other grassland. Only in the Pacific Northwest were substantial acreages of forest land taken. Very little urbanization came from idle land, cropland generally went directly into urban use.

Conservation Plantings for the Northeast . . . Invite Birds to Your Home. 1969. *USDA PA-940.* 16 pp. folder. \$0.25. Superseding PA-840, "Conservation Plantings . . . Invite Birds to Your Home," presents in color some of the birds and wildlife food in the Northeast.

Soil surveys

Dickens County, Texas. BY CHARLES L. GIRDNER, JR., AND WAYNE E. RICHARDSON. 1970. 67 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Lincoln County, Oklahoma. BY GLEN E. WILLIAMS AND DONALD G. BARTOLINA. 1970. 57 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Tallahatchie County, Mississippi. BY FRANK T. SCOTT, CHARLES D. BOWEN, HARMEL C. WILLIAMS, AND ABRAHAM E. THOMAS. 1970. 59 pp., illus.; maps 4 inches to the mile (1:15,840).

Runnels County, Texas. BY C. C. WIEDENFELD, L. J. BARNHILL, AND CLIFFORD J. NOVOSAD. 1970. 60 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Wicomico County, Maryland. BY RICHARD L. HALL. 1970. 90 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by C. D. Crocker, C. E. Emery, R. Feuer, R. L. Hall, F. Z. Hut-ton, Sr., D. C. Leer, and M. R. Nichols.

Greene County, Arkansas. BY NELSE W. ROBERTSON. 1969. 65 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Lincoln County, Minnesota. BY HILDING L. HOKANSON, WOODROW W. ANDERSON, DONALD W. CALKINS, KEITH W. HEIN, FRANCIS D. LORENZEN, JAMES J. MURRAY, RICHARD O. PAULSON, AND RONAND F. PETERSON. 1970. 84 pp., illus.; maps 4 inches to the mile (1:15,840).



Recon . . .

A quick overview of the conservation scene

Massachusetts watershed planners received the following favorable comments by U.S. Department of the Interior relative to the West Branch of the Westfield River Watershed Work Plan:

"The work plan is an outstanding example of comprehensive planning for small watershed projects. The plan sets a precedent for the integration of fish and wildlife resource preservation and enhancement and should serve as a model goal for the development of future Public Law 83-566 projects. We commend the watershed planners, project sponsors, Massachusetts Department of Natural Resources, and the Division of Fisheries and Game for this landmark plan for watershed development."

Sediment is No. 1

Silt is still the largest single pollutant of water. In the past third of a century, the silt that has been kept out of streams by the establishment of permanent cover alone would displace a volume of water equal to a 10-year supply for all U.S. households.—SECRETARY OF AGRICULTURE CLIFFORD M. HARDIN, in his first major speech on conservation and the environment at the National Farm Institute, Des Moines, Iowa.

Switchgrass and big bluestem are teamed with crownvetch in "Plant Material for Erosion Control in the Northeast" published in November 1969 by Cornell University. Recent studies back up planting recommendations. Much of the work was done at the Big Flats, N.Y., Plant Materials Center. PM Specialist Jesse L. McWilliams is one of the authors.

Laws of ecology

Ecology is the science concerned with: (1) the relation of living things to their environment, and (2) the factors which influence that environment. It is an expression of man's need to realize that he shouldn't try to mold the rest of the natural world to his wishes without adequate understanding of the laws that govern it.

Nature has been at work for a great many millions of years to get things as they are.

Man is a late-comer, and it is probably imperative to his survival to recognize that nature is a total of the conditions and principles which influence the existence of living things. Nature's laws were so contrived that land, water, plants, and animals should, and under natural conditions do, exist in harmony and interdependence for perpetual productiveness.—NORMAN A. BERG, associate administrator, SCS, to annual meeting of Arkansas Association of Conservation Districts.

Popular guideline

. . . "Demand for Routine Publications Astonishes Authors" might have headed a release from the Upper Darby, Pa., Regional Technical Service Center this spring. That is, if they had wanted more publicity for their "bestseller," *Guidelines for the Control of Erosion and Sediment in Urban Areas of the Northeast*. Of the 1,000 copies printed by the Hyattsville cartographic unit for distribution in March, not one was left to fill April orders. Planning commissions and others outside USDA added to the backlog of requests for the in-Service technical reference. The guide's principles have wide applications even though it is based on the soils and climate of 15 Northeastern States. It covers standards, specifications, and maintenance needs for vegetative and structural measures; resource planning in urban areas; cost-benefit analysis; and soil loss calculations.

Arkansas catfish farming acreage increased more than 80 percent last year, reports State Conservationist Einar Roget. In 1968, the land area used for this relatively new type of inland aquaculture was 5,951 acres;

by 1969 the figure had jumped to 10,948 acres.

Michigan's first erosion control law went into effect in April. An ordinance for the city of Ann Arbor (based in large part on standards developed in cooperation with SCS and the Washtenaw County Soil Conservation District) was adopted unanimously by the City Council on March 30, 1970.

Streamflow is not significantly decreased by level terraces, according to results of an Agricultural Research Service project that has been underway in Iowa since 1965. Studies at the Treynor Experimental Watershed show that rainwater re-enters streams as ground water instead of directly as runoff. The difference in stream levels below level terraced and unterraced land was less than 1 inch during the first year of observations.

Paying the price

At one time, if it was a choice of saving money or saving trees during construction, it was the trees that went. But public feeling now is such that the financially cheapest way of doing a job may no longer be the most desired way. People are increasingly concerned with their environment; they're questioning old priorities and they appear to be willing to foot the bill to make these changes.—RICHARD M. DAILEY, assistant deputy for watershed (operations), SCS, at the 1970 Watershed Forum, Topeka, Kan., March 1970.

Temporary erosion control in waterways was best achieved with oat straw pinned down by netting during experiments with artificial liners at Mississippi State University. Agricultural engineers compared the carrying depths of erosion net, jute mesh, stranded fiberglass, excelsior mat, and straw by increasing waterflow until the channel floor or test material failed. All artificial liners helped maintain channels while grass became established, but none matched the long term effectiveness of bermudagrass sod.



Good clean water for the future

Our water supply in the United States generally ranges from adequate to abundant. Good quality water, however, is becoming increasingly scarce. In economic terms, clean water is a "scarce good."

We have become accustomed to treating domestic water before using it. On the basis of past trends we can expect the need for treatment to increase for other uses in the future. Whether this is done at its source or at the point of use, Water Bill USA can be expected to go in only one direction—up!

President Nixon in a recent environmental message to Congress discussed the water-pollution problem with particular reference to agricultural sources—animal wastes, eroding soil, fertilizers, and pesticides.

Agriculture has a vital interest in clean water for several reasons. Farmers and other rural residents, as every one else, need clean water to drink. In addition they need good water for their livestock and crop production, and clean streams for fishing and swimming. At the same time, agriculture, as all other segments of our society, contributes to water pollution.

Sediment, a product of erosion, is one of the major water pollutants. Most sediment comes from agricultural lands. Sediment carries other water pollutants, such as organic wastes and inorganic chemicals and infectious agents. Sediment is a costly water pollutant. It adds to the cost of water to farmer and urban dweller alike. It depletes the capacity of lakes and reservoirs. It clogs stream channels and increases flooding.

There is now a growing realization that sediment also comes from construction in urban and suburban areas. Each year, about 1.5 million acres are stripped bare of trees and vegetation for new housing developments, roads, streets, schools, and other construction. While bare, these land areas erode and produce large quantities of sediment. Some studies in Maryland show that land undergoing urban development produces from two to 200 times the amount of sediment as nearby farmland. Without

control, nonfarm erosion will increase in the future.

What can be done to reduce this pollution of our waters? Perhaps of first importance is the realization that pollution is mostly a manmade problem and that man will have to solve it. One of Secretary Hardin's objectives is to foster environmental improvement and sustain productivity. This can be done by recognizing and understanding the relationship between soil erosion, land management, and water quality. Reducing water pollutants originating in agriculture and ameliorating the effects on agriculture of those originating from other sources are also important.

A major objective and goal of the Soil Conservation Service in the 1970's is to improve the quality of the environment to provide attractive, convenient, and satisfying living and working conditions for both town and country. Everyone will benefit from clean water, clean air, more wildlife, more attractive landscapes, fewer floods, and convenient recreation opportunities. To achieve this objective we must continue to emphasize the controlling of runoff and sediment delivery from the land in both urban and rural areas. And we must also emphasize the use of land-treatment measures for all watershed lands to improve water quality, to control urban erosion, and to abate all forms of agricultural pollution at their source.

Cleaning up America's polluted waters is a job for everyone—for every citizen, every municipality, every industry, and for government at all levels.

Kenneth E. Grant



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Honey Hollow watershed a historic first

In keeping with the movement all over the country to preserve our environment and historical heritage, a small watershed in Bucks County, Pa., was recently dedicated as a National Historic Landmark and thereby marked for preservation from the threat of nearby urbanization.

Honey Hollow, a five-farm, 500-acre watershed near the heart of a bulging East Coast megalopolis, was set aside as a historic "first" in group land use planning on a watershed basis. It proves that man can touch the land and enrich it for all mankind.

The Landmark citation spells out the reasons for this conservation designation: "The Honey Hollow Watershed Conservation Area was the first small upland watershed in agricultural use and multiple ownership to demonstrate that cooperative action, supported by Federal technical assistance was a practicable method of achieving national goals in soil, water, and wildlife conservation and flood prevention. As such, it served as a prototype for thousands of similar small watersheds throughout the Nation."

The important aspects in this story lie in the words "watershed" and "farmer cooperative action." The farmers simply wanted to farm better, and they did not know how to control the erosion they knew they had on their farms.



Honey Hollow, Bucks County, Pa., is the first small watershed project.

This was back in the thirties during the depression. There were no conservation districts to advise and help. The farmers went to the newly formed Soil Conservation Service and were told they had a watershed problem that could not be solved on single farms. This marked the start of the unique small watershed project.

Farm-by-farm, each individual conservation plan outlined by SCS took shape on the land, and through the years these measures served to make the entire drainage area an outstanding example of community conservation.

Thirty years have brought changes to Honey Hollow. Population has grown; land values increased; and threats of urbanism press on the area.

The watershed, the first of its kind, has historical significance, and today the families in the watershed seek, with the aid of many sponsoring organizations, to place Honey Hollow in the public domain as a conservation and nature education center.—MERVIN S. SKILES AND P. A. WARING, *district conservationist, SCS, chairman, Honey Hollow Watershed Association, Doylestown, Pa.* ♦



Soil **Conservation**

Devoted to the wise use of land and water resources

Helping counties plan for tomorrow

Soil Conservation Service, U.S. Department of Agriculture



Counties in action...

On the conservation front, district leaders and professional conservationists are discovering a larger purpose in their work—improvement of the whole community rather than resource improvement for its own sake.

County governments and their regional groups are discovering that in their quest for better communities, conservation facts and knowhow are invaluable.

Getting conservationists and counties together is the thrust of this month's articles.

In Wisconsin (p. 267) seven counties with half the state's population gear up to accommodate another million residents.

In Georgia (p. 270) teamwork on many fronts avoids duplication and wasted planning, and gets more done.

In Oregon (p. 273) counties look to the small watershed program for help in bringing close-to-home recreation opportunity.

Nevada counties perk up with help from a Resource Conservation and Development Project (p. 272).

Soil survey facts make a better building code in Ohio (p. 276), and a base for tax assessment in Nebraska (p. 278).

Rice finds a new use in Florida (p. 283); a Virginia county gets a new park, its first (p. 279); a Michigan watershed project returns 600 cents on the dollar (p. 275); and an SCS planting guide aids Colorado highways (p. 288).

Sediment control: A review (p. 284) and Administrator Grant's message (p. 287) call attention to an important new aid to county and district battles against our number-one water pollutant.

COVER: Fiber netting keeps a suburban drainageway stable until plants are up, Fairfax County, Va.

Soil Conservation

Devoted to the wise use of land and water resources

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Kicking, screaming, hungry and thirsty, 70 million more Americans will join us in the next 20 years. Almost a million of them will live in a seven-county region of southeastern Wisconsin. They will be among the lucky Americans; this area is *planning* for their arrival.

The counties of Washington, Waukesha, Walworth, Milwaukee, Ozaukee, Racine, and Kenosha are a modest 5 percent of Wisconsin. But they have 49 percent of the state's population and provide 50 percent of its jobs. The seven counties are Wisconsin's "big growth" area.

The problem of the area can be simply stated: Southeastern Wisconsin's population grows. Its land, water, and air supply does not. This is not unique. Too many people—with too little planning—have produced a nationwide familiarity with monumental traffic jams, ugly suburbs, and polluted lakes.

Dr. Kurt Bauer, executive director of the Southeastern Wisconsin Regional Planning Commission, is aware of the possibilities of environmental catastrophe—and equally aware of what can be done to avert them. Explains Dr. Bauer, "I don't include myself among the prophets of gloom and doom because I know, for example, that southeastern Wisconsin can absorb a million new people in the next 20 years and wind up with a better environment for life than we have today—if we use our heads."

SEWRPC

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) was signed into existence by then-Governor Gaylord Nelson in August 1960, upon unanimous petition of all seven county boards. The commission has 21 members, three from each county. It oversees a professional planning staff, headed by Dr. Bauer, which is charged with regionwide research and inventory of southeastern Wisconsin resources, preparation of a framework of long-range plans, and assistance to local authorities as they

Let's use our heads . . .

Wisconsin counties get ready for growth

implement plans at various levels of government.

Dr. Bauer feels that progress has been made. A regional land use and a regional transportation plan have been completed and adopted. Modern soil surveys, with interpretations, are available for all counties. (Soil scientists surveyed more than a million acres in 3 years.)

Planning guides

Six areawide planning guides have been published. More are in progress. Comprehensive plans for the Fox, Root, and Milwaukee watersheds are completed or in progress. The aim is good land and water use in areas of rapid change.

"Further," says Dr. Bauer, "some of the planning recommendations are off the desk and into action." He points out that state, county, and other units of government are the principal agencies to pass and enforce land and water-use ordinances. SEWRPC's role is to provide information, make basic recommendations, and assist state and local governments, upon request, with preparation of regulations.

The regional transportation plan has been adopted by all seven counties. One feature will be exclusive roadways for a network of county rapid transit buses.

Protective regulations are now mandatory, statewide, for flood-plain and shoreland areas. Zoning permits are denied in five of the seven counties if the proposed use of flood-plain land is incompatible with protection requirements.

The town of Belgium in Ozau-

kee County has a zoning ordinance which helps discourage scattered residential development through exclusive agricultural zoning areas of 20 acres or more. Wet-land areas are protected through conservancy districts, which allow compatible uses such as fish hatcheries, wildlife, hunting, and sustained-yield forestry. The Belgium ordinance also prohibits onsite septic-tank filter fields where soils have severe limitations for this use.

Sanitary ordinances

Walworth and Washington counties have sanitary ordinances to regulate onsite sewage disposal and private water-supply systems. Kenosha has a similar ordinance, but applies it only to shore and flood-plain land. The city of New Berlin in Waukesha County has amended its plumbing code to regulate installation of septic tanks. Waukesha County has adopted a new sanitary ordinance. Milwaukee County doesn't need to; it is completely served by public sanitary sewers.

These revised sanitary codes incorporate SCS-supplied soil survey information.

Soil-wise sanitary codes are particularly important in southeastern Wisconsin because approximately half of the area's soils are unsuitable for septic-tank use. Says one local planner, "Can you imagine the hundreds—really thousands—of families that are personally affected because they innocently built new homes, put in a septic-tank system that couldn't work, and then had their kids get sick? Or

perhaps they ran up big bills trying to repair the damage. We think people in our area have the right to expect that local government will protect their interests by helping them avoid these kinds of problems."

Logic versus leapfrog

Dr. Bauer and the commission feel that, for areawide planning purposes, the region can be divided into three broad areas:

(1) Areas that can be developed for urban use, including areas that can be readily served by public sewer and water-supply facilities, and good transportation facilities, including mass transit lines.

(2) Areas that should be kept in productive agricultural use.

(3) Areas of "fragile" lands encompassed in environmental corridors along streams and around lakes, steep slopes, woodlands, wet lands, and still-wild areas, which should be kept in an open, natural state.

When there is no planning, and when urban sprawl takes over, the results go far beyond landscape despoliation. Often, they mean economic hardship and misuse of natural resources. "For example," says Bauer, "if leapfrog development occurs on prime agricultural land that should stay rural, and a sanitary sewer trunk is run past the land of a man still trying to farm, the farmer may be assessed for half a mile of sanitary sewer he can't

use. This, in turn, will drive him off the very land that should stay in agriculture."

Unplanned growth can short-change town taxpayers too. Some towns believe that all growth adds to their tax base. But a study in Walworth County shows that new homes there must be worth \$50,000 to \$60,000 just to "break even." That is, they must bring in enough new tax money to offset the city's added public costs for schools, police, fire, water and sanitary and other public facilities and services. Planning can "group" urban areas and balance community growth so that everyone benefits.

A look at the soils

The ground beneath is understood in southeastern Wisconsin. SCS soil scientists mapped the entire region and developed interpretations for—

... engineering purposes, such as soil limitations on road construction.

... planning purposes, with soil limitations for home building with or without public sewer systems.

... agriculture, for crops, pasture, or woodland.

... esthetic and recreational uses, with limitations or advantages for maintaining wildlife or building parks.

Within this framework, there are six precise interpretations for engi-

neering uses; seven for road construction; 12 for water management; and eight for farm or rural uses.

Southeastern Wisconsin has a particularly strong need for information on soils suitable for septic-tank sanitary systems. Almost any group of businessmen, builders, or housewives can tell of unlivable homes, abandoned subdivisions, or expensive building repairs resulting from lack of soil information.

This is not necessary. Dr. Bauer has estimated that citizens in the region can save \$300 million in the next 20 years through the proper use of SCS soil survey information to locate new homes on suitable sites.

SEWRPC officials, who paid \$130,000 to cost-share the soil survey, use soil information extensively in their planning work. It is useful, for example, in selecting sites for parks, airports, golf courses, and wildlife preserves as well as areas suitable for residential, commercial, and industrial development and locations for roads and transitways. Fourteen of the 26 major recreation areas recommended by SEWRPC for 1990 are in use, and nine of the remaining areas have been wholly or partially acquired by public agencies. SCS will assist in the soil and water conservation phases of the new park development.

Soil information indicates where filling, dredging, lagooning, or land grading can be safely done and where selective cutting of shoreline vegetation is possible. Wisconsin's 1965 Water Resources Act requires all counties to protect their shorelands, and SCS soil survey information helps local governments to delineate the needed zoning areas. In some counties, the soil map is part



A high water table, which the builder could have learned about in the Waukesha County soil survey means trouble in this basement excavation.

Farming unsuitable land in Washington County, Wis., led to the forming of a huge gully which now threatens the farm house.



of the official document on which the zoning ordinance is based.

The Fox River watershed covers 35 percent of the seven-county region. Its land and water problems sound like a shopping list of environmental ills: Increased flooding from rapid land use changes, water pollution, accelerated soil erosion and silt buildup, and inadequate reservation of park and open space areas.

The Fox River watershed study covered all major water uses and problems. SCS did the major work on the hydrologic and hydraulic parts of the study.

Flooding is a serious problem. Damages may double in the next 20 years if nothing is done. SEWRPC watershed planners are recommending good land use as their major flood-prevention method. "Protect the flood plains of a river," says Dr. Bauer, "to preserve the natural floodwater-storage capacity. Use the land for purposes compatible with the requirements of the stream system in time of flood."

Pollution is serious. Ten of the 12 major lakes sampled in one study had coliform bacteria levels higher than state water-quality standards permit for swimming. Yet, the demand for water-based recreation in those lakes will almost triple by 1990—not to mention the need for domestic and industrial water.

Municipal sewage plants are the most important source of water pollution—not because of inefficient operation or defective designs, but because the region's waterways have a low natural base flow and low waste assimilation capacity even for treated sewage. In some areas of the Fox River, 75 percent of the summer and fall low flow consists of treated effluent. If nothing is

done, this will rise to 90 percent by 1990, and some streams will become little more than open sewers.

To prevent this, SEWRPC watershed planners recommend two major changes: More intensive sewage treatment and more coordination between future urban development and the soil types suitable for onsite sewage disposal.

Currently, all plants in the watershed provide secondary treatment of sewage. The study proposes that advanced waste treatment be provided. This will remove nutrients from the waste water as well as additional oxygen-demanding wastes to the point where swimming and game fishing will again be possible. The sewage treatment proposed is so advanced that only one or two small areas in the Nation now have it.

What will implementation of the Fox River comprehensive plan for water management cost? An estimated 7 to 8 percent increase in local property taxes, says SEWRPC planners. The alternative, they explain, is not the status quo, but a worsening of present flood, pollution, and silt problems as the population increases and land and water resources are more heavily used.

Dr. Bauer sees a need, as do many of his planning contemporaries, to extend the knowledge and experience of SCS and local soil and water conservation districts into urban areas. Take Milwaukee, with its million residents—the industrial,

commercial, and shopping center of southeastern Wisconsin. Frank Underwood, head of the city's water department, says sediment was not a problem in water until 40 years ago. Milwaukee taxpayers now hand over a half million dollars a year to take the sediment out of their water supply. And the U.S. Army Corps of Engineers says that in the next 10 years the city will pay another \$3,282,128 to keep the Milwaukee harbor free enough from sediment to stay navigable.

In its land and water use problems, Wisconsin is no worse off than many other areas of the Nation—and perhaps not so bad in many respects. The difference is that—along with some other regions—southeastern Wisconsin has looked squarely at the future and is working out better ways to use its natural resources.

Walter Lippman wrote: "Anything that makes the world more humane and more rational is progress; that's the only measuring stick we can apply."

Southeastern Wisconsin has cast its vote for progress. The wisdom of its choice can be judged better in 20 years. But now, in 1970, its citizens are off and running, with the tools of imagination, technology, and research firmly in their hands and determination to implement their land use and other plans.—CAROLYN M. JOHNSTON, *Information Division, SCS, Washington, D.C.* ♦

Team effort paying dividends in Georgia's resource planning

By Trammell Carmichael and R. W. Oertel

President, Association of County Commissioners of Georgia, and assistant state conservationist, SCS, Athens, Ga.

The conservation development of Georgia's natural resources is moving forward at a quickening pace.

This faster progress can be traced to a team effort by county and city governments, multicounty planning and development commissions, soil and water conservation districts, and the Soil Conservation Service. They are working together on such efforts as county and multicounty planning, the Gwinnett County Resource Conservation and Development Project, watershed development, recreation-potential inventories, flood-plain zoning, roadside-erosion control, and the location of a new major airport.

This coordinated approach means less duplication and wasted planning that in the past ended sometimes in contradictory decisions. It

also means a more united and concerted effort by all groups toward projects of community- and area-wide benefit.

Roadside-erosion control

For many years officials of city and county governments in Georgia have cooperated with conservation districts and the SCS on roadside-erosion control and beautification. Nearly 20 years ago the state association of county commissioners and conservation district supervisors adopted a joint program of road-bank-erosion control demonstrations. Thousands of miles of highway backslopes have been shaped and seeded to erosion-stopping grasses and legumes.

Harold Hefner, county commissioner of Gilmer County in the heart of the Appalachian Mountains of north Georgia, reports: "We've seeded more than 375 miles of backslopes to keep them from washing away. Our seedings save us a lot of time and money we once spent keeping our ditches and road pipes clean. I tell you, this is one of the best programs we've ever gotten into here in Gilmer."

Commissioners in Fulton County (metropolitan Atlanta) entered into

a three-way agreement with the Atlanta District and SCS to improve roadside backslopes.

In Walton County the teamwork goes a stride further. There county commissioners, conservation district supervisors, and SCS men each year select sections of secondary roads needing roadbank stabilization. Conservation-treatment plans are prepared by SCS. The areas are then shaped by county employees in slack periods.

District cooperators donate sericea lespedeza hay which is cut and baled green in early fall. County highway crews spread the hay on the prepared slopes. The ripening seed filters through the hay mulch to the seedbed below. Many miles of Walton County roadsides now are covered with lush sericea.

Flood prevention

City-county-district-SCS teamwork is one of the reasons Georgia has one of the most active small watershed programs in the Nation.

"It just makes good sense that we all work together on this because the entire community benefits from these projects," Jim L. Gillis, Jr., said. Gillis is a district supervisor, a county commissioner, and chairman of the state's Soil and Water Conservation Committee.

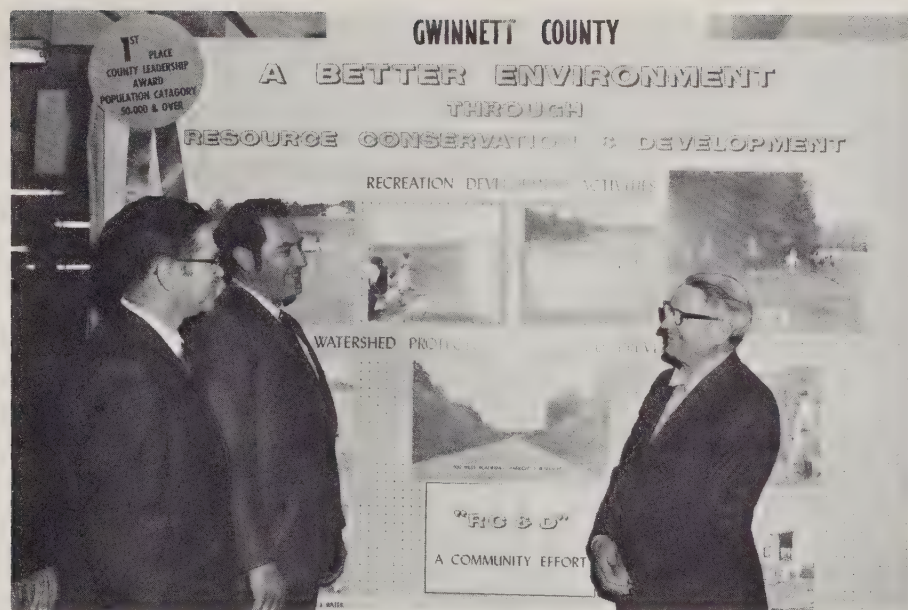
Almost since the small watershed program began in the mid-fifties, county governments and conservation districts have cosponsored all watershed projects in Georgia. Today the state ranks as one of the leaders in the Nation with 19 projects completed and 40 in the construction stage. Flood-prevention benefits already have amounted to more than \$1 million annually.

J. Dixie Harn, Bryan County commissioner, worked with the Coastal Conservation District officials and SCS on the Mill Creek Watershed Project. Last year, even though the project was only partially constructed, the team effort paid off when 70 inches of rain fell in 4 months, 10 inches of it in 6 hours.

"If it hadn't been for this water-



Thick sericea lespedeza checks erosion along hundreds of miles of Cherokee County, Ga., roads. Conservation district supervisor, R. F. Quarles (left); county commissioner, Trammell Carmichael; and Joe Booth, SCS, check the lush growth.



From left, Robert Peeples, SCS; W. R. Pruitt, Gwinnett County commissioner; and Glenn Bennett, ARMPC executive director, before exhibit showing county progress through RC&D.

shed project," Harn said, "water would have stayed around here for weeks and weeks. It's hard to count up all this watershed means to this community."

Planning commissions join

A new partner was added to the county-district-SCS team several years ago when Area Planning and Development Commissions (APDC) came into the picture. The first of these modern multicounty groups, the Atlanta Region Metropolitan Planning Commission (ARMPC), was born in 1947. It now has the distinction of being the oldest publicly supported agency of its kind in the Nation. Today 18 APDC's cover the state and complement the work of about 200 city and county planning commissions.

Glenn Bennett, executive director of ARMPC, says, "Our agency is dedicated to guiding metropolitan growth. We consider our principal job to be that of making and updating a regional development plan. Our preliminary plan was developed with little attention to the soil and land conditions. But our revised plan published last year is based upon the best soil information available from the Soil Conservation Service."

The working relationship between the ARMPC, the Atlanta and Upper

Ocmulgee conservation districts, the SCS, and the county governments was the first to be formalized in Georgia.

Working agreements between other area planning commissions, conservation districts, and the SCS throughout the state followed. These form the basis for programs of work to plan, conserve, and develop the natural resources of Georgia.

Joint projects

One of the first major activities after APDC's became "team" members was the development by SCS of revised generalized soil maps for all counties in the state with interpretations for many agricultural and nonagricultural land uses. APDC's have published this information in attractive booklets bearing such titles as *Soils Interpretations for Regional Planning in Metropolitan Atlanta*, *Soil Suitability for Land Use and Development in the Coastal Plain Area*, *Soil Interpretations and General Soil Map in Slash Pine Area*, and *Soil Suitability for Land Development—Lincoln County*.

Appraisals of outdoor-recreation potentials have been a second major activity of the district-county-commission-SCS team. This information is being published jointly. *Potentials for Outdoor Recreational Development in Gwinnett County*

RC&D Project is an attractive booklet being used widely by all groups to promote recreation development.

A more elaborate publication, *Recreation Potential Analysis*, was published by the Lower Chattahoochee Valley ADPC. A 20-year master plan for recreation was developed for the city of Columbus and Muscogee County using the soils and recreation data.

Richard K. Allen, executive director of the Lower Chattahoochee Valley APDC, in speaking of benefits from the working arrangement with the conservation district and SCS said, "Our agency, its 43 cities and towns, and our seven counties have received a huge dollar value in services."

The site for a second major airport for Atlanta is an example of how the team approach can sometimes help find answers to unusual development problems. Early in the discussions the ARMPC called upon the soil conservation district and SCS for an "in-depth" evaluation of four potential sites and for three separate runway configurations for each site. After consideration of the many physical factors involved in land use determinations, SCS presented technical information on each of the locations.

Public officials charged with planning and development are everywhere encountering a mounting public concern over a quality environment. Teamwork between Georgia's city and county governments, conservation districts, and the SCS is taking advantage of combined knowledge, skill, and judgment from many sources to meet these challenges in the best conservationist tradition. ♦

State legislature bolsters central Nevada RC&D

By **Albert Neu**

Project coordinator, SCS, Austin, Nev.

A 12-million acre section of central Nevada, where mining once was king, is like a western-style Rip Van Winkle who, after idling on the range all these years, is saddled up and riding again.

It was prosperous country in the old days, until the mines began to play out. Livestock has been the backbone of the economy since.

Lack of year-round employment has been a problem. Young folk, with no jobs in prospect, left as soon as they were able.

The Central Nevada Resource Conservation and Development Project with strong support from the state legislature is behind the new bustle and stir.

In 1966 the local leaders in Nye, Eureka, Lander, and Esmeralda counties and the Tonopah, Eureka, Austin, and Esmeralda soil conservation districts formed the Central Nevada Development Association. They looked around for help and learned the RC&D Program of the U. S. Department of Agriculture would be a likely source. In June 1967 the application for RC&D assistance to the Soil Conservation Service was ready.

While awaiting word on the application, the association called on the Central Nevada Resource Action Council to help with work on its plan for area development. The council comprises representatives of state and federal agencies that may be able to assist with local and area economic problems and development projects.

When the Central Nevada RC&D Project was authorized for planning, in September 1968, the local citizens had made an impressive start. A

workable plan for area resource development was completed. In March 1969 the project was authorized for operations.

Leaders of the project agreed that a group with legal powers would mean the work could move faster. They proposed to the state legislature the creation of the Central Nevada Resource Development Authority. Established by legislative act in 1969, the authority is governed by a five-member board and includes an eight-member advisory planning commission. The advisory commission is composed of two representatives from each of the four soil conservation districts. This is the group which also serves as the steering committee for the Central Nevada RC&D Project.

The authority has the power to conduct surveys; enter into contracts; borrow money; buy land; and build, operate, and maintain works of improvement.

The authority promptly completed an overall program design and applied for planning funds from the U.S. Department of Housing and Urban Development. The HUD planning program will mean help on specific problems with additional coordination of a regional plan for the area. This step will include a capital improvements program with plans for economic growth, housing, water, sewer and public facilities, recreation, and transportation.

Priorities are being set. Preparation of a detailed 1-year program and a general 5-year program is in the works. Considered will be zoning, subdivision regulations, deed restrictions, building codes, and uni-

fication of codes and ordinances.

An example of the new approach to use of the area's natural resources is called the Kingston development. Public and private interests are working together to create a playground unique in the West. A village, patterned in the style of a century past, is being built of adobe. The Nevada Fish and Game Commission has completed one mountain lake and will soon have another ready for use. The U. S. Forest Service is improving roads, trails, and campgrounds.

Plans to make desert land more useful are underway. A special Agricultural Stabilization and Conservation Service seeding program is providing for forage production, with funds up to 80 percent of the cost of seeding, irrigating to establish a stand, and fencing.

In cooperation with the Nevada State Park System, the authority will identify sites of historical interest and install markers.

A composite recreation-management plan has been compiled by Toiyabe National Forest planning specialists for the north end of the Toiyabe Mountain Range.

A series of 1-day ghost town tours is being developed, and the Toiyabe Trail Ride and Living History Days Celebration, held first in 1968, seems destined to be an annual attraction.

Feasibility studies are underway by the Sierra Pacific Power Company to use Rural Electrification Administration funds to bring electric power to the area. Central Nevada is one of the largest areas in the United States not served by low-cost electricity.

Perhaps the most significant accomplishment in central Nevada's new push for rural development is the growing spirit of cooperation between the various county governments, state and federal agencies, and private enterprise. Results already indicate that the cooperative effort will mean an exciting new future for an area rich in Nature-given resources and in the fascinating history of the Old West. ♦



Oregon counties invest in watershed lakes

By Galen S. Bridge

Assistant state conservationist, SCS, Portland, Oreg.

In Oregon a million or more residents, who look mainly to the outdoors for fun and inspiration, have their eyes on developing plans for water-based recreation a few minutes from home or work.

Their county governments, along with soil and water conservation districts and other sponsors, are taking advantage of the opportunity to develop recreation values in upstream watershed projects. And among the added benefits are water supplies for growing communities, irrigation water for farmlands, and the reduction of flood damages on area lowlands.

Counties near major population centers long have felt the heightening demand for water areas where people could swim, fish, and boat. To meet this demand, four counties are planning or installing facilities to accommodate more than a million outdoors-loving visitors a year.

In Clatsop County, for example,

is new Lake Cullaby. More than 80,000 people last year used its 200 sparkling acres of water, with beach, boat ramps, and docks.

In Douglas County's Sutherlin Creek watershed, a recreation development is nearly ready on Cooper Creek Reservoir. The county's Park and Highway Departments are investing \$300,000 in roads and facilities. In that same watershed 80,000 visitors enjoyed water fun on another reservoir built for flood prevention and irrigation. Planners are busy with drawings for the Calapoois watershed.

Douglas County also has assisted the city of Sutherlin, the Sutherlin Water Control District, and the North Douglas Soil and Water Conservation District in carrying out their responsibilities. Highways have been relocated, planning assistance provided, and general support made readily available. The county is now involved in the development of a

plan for the Calapoois watershed.

Polk and Washington counties are laying even more ambitious plans. Both are near major metropolitan areas and have an urgent demand for water-based recreation.

Through the McKay-Rock Creek Watershed Project, Washington County will develop water and facilities to serve a half-million visitors annually. These developments, within 30 minutes of the half-million Portland residents, will take place on two separate reservoirs.

Rock Creek Reservoir, with a permanent recreation pool of 540 acres will have 140 acres of adjacent land set aside for public use. The area is designed for intensive day use at swimming beaches, picnic sites, and boating facilities. Arrangements for the physically handicapped will be provided.

At a second site in this same project, Washington County proposes to develop 9,000 acre-feet of

municipal water along with recreational facilities. The county has been integrating this project into county and metropolitan master plans for water and land development.

Polk County is developing plans on the Little Luckiamute watershed to include a large recreational development on Teal Creek Reservoir within 30 minutes' driving time from Oregon's capital city of Salem.

The recreation agency of the Mid-Willamette Valley Council of Governments under the direction of Polk County has developed a plan which includes the addition of 15,000 acre-feet of recreation water to the Teal Creek Reservoir. The 260 acres of land around the reservoir is reserved for public use, and facilities will be adequate to meet a peak daily use of 10,000 visitors.

Polk County also is developing 4,000 acre-feet of municipal water supply and assisting other local units of government with flood prevention and irrigation development in the project.

Lane County got an early start in watershed protection. Work on one project has been completed, another is nearly complete, and the Amazon and Flat Creek Project is underway. Leadership of the Lane County commissioners and staff, along with their willingness to invest county funds, has made this progress possible.

Interest in resource development is high in Lane County. Seven additional applications have been submitted to the Secretary of Agriculture for assistance through the small watershed program. The county is a sponsor of the first Resource Conservation and Development Project in Oregon and one of the first 10 in the Nation. Frank Elliot, one of three county commissioners, serves as a member of Oregon's Soil and Water Conservation Commission.

The demand for water development in Oregon is expected to grow. This demand and increasing concern over the total living environment will encourage governmental participation at all levels. Oregon counties are doing their part. ♦

Catfish crop to increase economy

Farmers in Hardin County, Tenn., with the help of federal and state agencies are promoting a unique farm crop—catfish—that promises to increase the economy in the area.

It started several years ago when SCS helped farmers in the Hardin County Soil Conservation District develop catfish production in multipurpose farm ponds. More than 30 farmers began to feed catfish.

Four years ago farmers organized the Hardin County Catfish Producers Association to pool fingerling orders, purchase feed at reduced prices, and exchange ideas. Then the association organized and chartered a marketing cooperative and applied to the Farmers Home Administration for a loan to construct a marketing facility.

Realizing the potential economic impact on the area, members of the seven-county Shiloh Economic Development Corporation joined as a sponsor, and the Office of Economic Opportunity made loan funds available through FHA.

In 1968 the cooperative bought a 94-acre tract of land on State Highway 57 between Shiloh National Military Park and the Tennessee Valley Authority's Pickwick Dam. The plans for the business are to sell most of the fish on a fish-out or pay-lake basis for a small fee and to operate it as a tourist and recreation complex to attract the annual surge of tourists and fishermen. Other facilities include fish-out lakes, concession buildings, live fish vats, fresh and frozen fish, and camping and picnic areas. SCS designed the system of holding and fish-out ponds.

At present the cooperative's 75 members are "farming" 200 acres of water. The project will expand, and membership is expected to increase to 200. Two-thirds of the original membership consisted of low and modest income farmers who qualified for the FHA loan.

Cooperation has been excellent.

The Hardin Farmers Coop stocked special pond pipe, chemicals, pond fertilizers, and fish feed, and Hardin County Highway Department graded and surfaced the driveways and parking areas.

The project brings a new source of income for many farm families, provides more recreation opportunities, and improves land use.—S. D. YOUNG, *district conservationist, SCS, Savannah, Tenn.* ♦

Raceways excel ponds for raising catfish

Catfish raising in raceways has proved an advantageous variation of a new economic enterprise for some Georgia fish farmers. The raceway system has a higher production potential than ponds or lakes, which, under good management, yield about 1 ton of fish per acre annually. Each 100-foot segment of an earthen raceway has that capacity.

Raceways are laid out much like terraces but with a fall of 2 feet per hundred. Bottom width is 10 feet; side slopes are 1:1 or 2:1; fish swim in 2 to 4 feet of water that flows by gravity through segments separated by notched walls every 100 feet. Last year, owners installed 14 systems with a total length of 21,400 feet. This year 193 landowners plan to build an additional 386,000 feet for increased channel catfish production. ♦

For nearly 40 years Misteguay Creek in south central Michigan was a periodic headache to farmers.

Its annual bill of damages—mainly in flooding of cropland and destruction of roads and bridges—averaged more than \$200,000.

The creek rises along the western boundary of Genesee County, crosses northeastern Shiawassee County, and empties into the Flint River in the "Prairie Farm" area south of Saginaw.

The Watershed Protection and Flood Prevention Act of 1954 offered the opportunity the landowners in the 104,000-acre watershed needed. With sponsoring organizations in the three counties, they prepared an application for project help. The sponsoring organizations were the Genesee, Shiawassee, and Saginaw soil conservation districts and the Misteguay Creek Inter County Drainage District. These were joined by the North Creek-orser, Onion Creek, Porter Creek, and Peart (inter-county) drainage districts.

The plan for the watershed, developed by the local citizens with technical help from the Soil Conservation Service, was approved for work in August 1960.

Three floodwater-retarding structures were built. Nearly 6 miles of main channel had been improved when the first real test of the project came in the spring of 1967.

Heavy snow accumulation melted rapidly, and the resulting runoff surged downstream. Each of the three earth and concrete dams functioned as designed. Water was stored for a short time and released at an orderly rate. The rate of runoff is believed to have approached the volume expected once in 50 years.

The Misteguay Project is a tribute to local residents. The untiring efforts of the three soil conservation district board of directors, the drainage district commissioners, and the other local leaders helped to make a dream become a reality. The late C. K. Colby, former Shiawassee County drain commissioner, did

Benefits adding up . . .

Misteguay now flows like a good creek should

much to coordinate the intercounty drainage and flood-control work.

The legal county drain had been under injunction by court order since 1946, restricting farm drainage at the upper end of the watershed. Residents in the area subject to damage by flooding contended that drainage activities in the watershed were increasing their problem. The injunction was lifted when an agreement was reached on the work-plan structural measures.

The local people accepted responsibility for land easements, rights-of-way, and contract administration, bore the cost of 65 percent of the channel work, and assumed responsibility for maintenance.

Federal assistance totaled \$881,000 for installation of the engineering works and for SCS technical help. SCS conservationists also helped as the farmers stepped up on-farm conservation measures which are important in reducing runoff and controlling erosion and sediment production.

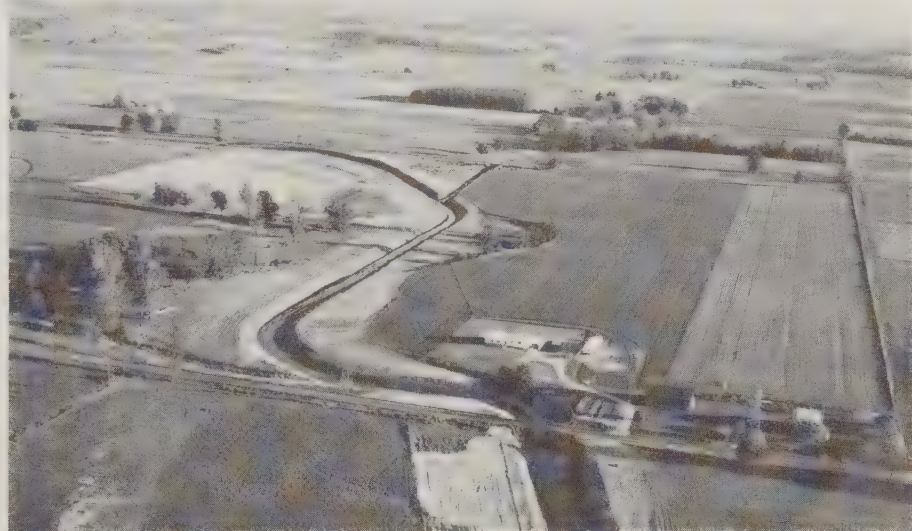
The Agricultural Stabilization and Conservation Service helped with cost-sharing for conservation work on the land, and the Farmers Home Administration made a loan to finance the local cost of drainage improvements.

The 1,350 farmers in the drainage area will plant 16,600 acres of cover crops a year to prevent soil loss. About 5 million feet of tile and 640 miles of open drains will help relieve the threat of crop loss as the farmers plant navy beans, soybeans, corn, and other crops.

About 600 acres of trees have been planted on land best suited to forestry and wildlife.

The Misteguay Project carries the distinction of having one of the highest returns in relation to cost of any such project—\$6.10 for each dollar invested. You can add to that a new sense of freedom from worry on the part of farmers when floods threaten again.—CARL R. STAMM, *district conservationist, SCS, Flint, Mich.* ♦

Some of the channel improvement on Misteguay Creek watershed help floodwater-retarding structures do their job.



Soil survey is base for building code

By Frederick S. Merrill

District conservationist, SCS, Canfield, Ohio

Sam Fiordelise, a Mahoning County, Ohio, building inspector, is helping to put a stop to bulging basement walls and broken roads. When he sends one of his staff to Canfield to inspect buildings, the inspector looks not only for the normal requirements of a good building code, but also at the soil survey map. Why? He must be sure that the part of the code that deals with soil problems is being followed, too.

Canfield is in the rapidly expanding metropolitan corridor from Lake Erie to the Ohio River.

As Canfield grew, developers were interested in constructing homes in a wooded section north of the business district. Because of topography and land use, this was the only direction for growth. In less than 5 years, the section developed into a thriving residential area with wide streets, spacious lots, and homes with price tags from \$50,000 to \$150,000. Soils that once grew trees and corn were sprouting homes.

The homes and roads met the normal building codes, but something was wrong. When ladies attended a session of their garden club, or when neighbors met while mowing their lawns, they would cautiously ask, "How's your basement?"

The reply was a guarded, "Not too good," and was followed usually by "Neither is mine."

To the trained eye, there was trouble connected with these "wooded lots." The tree in the yard was a swamp white oak, a tree that grows best in poor, wet, heavy clay soils. And on a hot summer day, the soils developed cracks that one could slide his hand into.

Francis McLaughlin, the new mayor, was worried over "the soil problems." There was also a new face in council—Bill Masters, a



Steep areas are fertilized, seeded, and mulched (above) to prevent soil erosion from clogging sewers and drainage ditches and to stabilize steep slopes bared during construction. Steel-reinforced basement walls (right) can be used where high shrink-swell soils are a problem.

member of the Planning Commission. These two were determined to do something.

They got in touch with the Mahoning Soil and Water Conservation District supervisors who asked the Soil Conservation Service to discuss the soil problems with the county and city government officials.

The mayor explained: "Areas are developed, and within a year the roads have gone to pieces and some of these beautiful new homes have cracks in the basement walls so wide you can see through them."

The SCS soil survey was explained. The maps indicated that many of the soils in the area had limitations, problems not so apparent when the area was rolling farmland. But they produced virtual nightmares when put to another use.

Canfield officials retained a pri-

vate engineering firm to design walls, foundations, and roads that would hold up on problem soils. SCS provided information on erosion control. The engineering firm then incorporated the technical data into a building code.

One problem remained—enforcement. Since the county already had a well-staffed building inspection department, could the county inspectors enforce these new regulations? Conferences with the Mahoning County commissioners, planners, and the building inspectors were favorable. Certainly, it could be done. All that was needed was special training for the inspectors.

The interest of the county officials has been excited by the results. In time, all Mahoning County building codes may be based on soil survey and interpretation data. ♦



Drainage is provided between internal basement walls to prevent upward movement of water through basement floors. Building footings 30 inches wide instead of the usual 18 inches are used to provide bearing strength and prevent settlement.



Where wet soils are a problem, special asphalt and sheets of plastic are applied to the outside of basement walls (left) to provide a watertight seal. Canfield Village officials (above) gather to sign the working arrangement with the Mahoning District. Seated from left: William Anderson, clerk; Bob Brooks, councilman; Dean Beadsley, Mahoning District; Francis McLaughlin, mayor; William Masters, councilman; Richard Sheets, engineer. Standing from left are Charles Simmers, councilman; Clifford Morrison and Earl Ruggles, Mahoning District; Edgar Kimmel, councilman; Fred Merrill, SCS; and John A. Culler, Mahoning District.

Soil maps are peg for land assessment

By **Vernon A. Wortman and Robert S. Pollock**

District conservationist and soil scientist, SCS, Fairbury and Hebron, Nebr.

In Jefferson County, Nebr., farms are taxed according to the kinds of soil on them.

The procedure, based on the soil survey completed in 1968, has been accepted with few complaints.

County tax assessor, Raymond Schmidt, says the system was cheap and easy to install. He got permission from the county commissioners to buy copies of the county soil survey maps from the Soil Conservation Service for about \$200.

With the help of seven local people on an advisory board, and with facts supplied by agricultural agency representatives, Schmidt adopted a system for using the soil information from the recently completed soil survey for land evaluation.

The state tax commissioner's handbook now provides: "Classification of rural lands shall be based on and comply with the classifications determined by the latest soil map prepared by the Soil Conservation Service."

The soil symbols for Jefferson County were grouped into eight

groups based on soil characteristics such as depth, texture, slope, and other factors. Beginning with the group 1—deep, loamy bottom land—they cover all the conditions down to group 8, wasteland. Soil survey symbols directly from the maps are listed with each grouping so that taxpayers can double check their own assessment. Cooperators with the Jefferson County Soil and Water Conservation District check their tax records with the soil and capability maps in their conservation plans.

Schmidt and his advisers, after study, assigned comparative land values for each soil group. They invited agricultural economist, Phil Henderson, University of Nebraska Extension Service, to discuss land values, yields, and production factors with them. Final decisions were made by local people after hearing the expert.

To introduce the new system, county officials and advisers held a series of public meeting and field tours. They asked SCS people to

explain the soil survey and soil groupings. Extension Service people discussed yields, prices, and management factors. Questions to seek full understanding were invited.

Adjustments were made where groups 1, 2 and 3 were in grass or trees, because of the differences in net return compared to row crops. Other adjustments for irrigated land were necessary.

To get accurate figures on land use, the advisers used information from the local Agricultural Stabilization and Conservation Service office.

After the new values (or adjustments) went out there were 180 appeals out of the 2,000 landowners in the county.

"We could have avoided most of these if we had had the most recent cropland and pasture information ahead of time," said Schmidt. A few minutes' check of maps and figures with the appeals settled all but 35.

"People being people, there will always be a little dissatisfaction with taxes," Schmidt explained.

Some valuations went up. Others went down. Equalization is the goal.

Past reappraisals were made by considering assessments in surrounding counties, looking at prices for land, estimates by real estate people, and other variables. Schmidt thinks the new system based on soil survey is more accurate and fair. Most people seem to agree. ♦



From left, SCS District Conservationist Vernon Wortman; Tax Assessor Raymond Schmidt; Soil Scientist Robert Pollock, SCS; and Mrs. Irene Hunsberger, assessor's office clerk, review soil survey data that aid tax assessment.



LeRoy Mitchell (left), Cypress Park pool manager, explains operation of a poolside water-filtering device to Rufus Hart, treasurer, Citizen's Advisory Council; Pete Garrison, SCS; and Edward L. Felton, chairman, Nansemond County Park Authority.

Success of community venture sparks area playgrounds drive

Cypress Park, which at present is 4 acres and a swimming pool, is the first public development of its kind in Nansemond County, Va.

For the county and probably for a much larger area it is only a beginning. Already plans are taking shape.

For many of the 9,000 children and 800 adults who made use of the park and pool for its first season last year, it was a first experience in water just for swimming.

You see, income in Nansemond County is only 71 percent of Virginia's average. For some families the income range is pretty low. But at Cypress Park pool no one who wanted to swim was turned away. Those who didn't have the 25-cent admission price could help with work around the pool to earn the fee. The neighborhood group that sets policy and the few regulations

that are needed decided that even so small a fee would mean appreciation of the park's value. It has seemed to work out that way.

The idea that produced Cypress Park also resulted in the forming of the Citizens Advisory Council. LeRoy Mitchell, who now manages the park, helped with the organization work. Rufus Hart served as treasurer. A round of church suppers, raffles, and door-to-door canvassing followed. Local business men chipped in.

The County School Board deeded the land to the Park Authority of which Edward L. Felton is manager. Technical help for developing the site was furnished by the Soil Conservation Service through the Peanut Soil and Water Conservation District.

Construction was not without its problems—the soils were predomi-

nantly wet. But in June of 1969 the park was ready. Dedication speakers, the high school band musicians, and an enthusiastic gathering of citizens were on hand for a ceremony. A thousand swimmers that day took their dip free in the 84-foot-long pool.

You can't imagine a community with greater pride in an achievement. Commonwealth Attorney Robert Gillette estimates the new park serves 25,000 people.

"We could use 20 more parks like it," he observed.

Chairman Felton of the Park Authority, which was created to bring the project into being, reports that other recreation areas for the county even now are under study. The Peanut District already has pinpointed possible park locations. Felton says the county is inviting neighboring counties to join in a regionwide park development movement to provide for needed recreation space. The need, he explains, is intensified by the spread of population from urban centers like Norfolk, Portsmouth, and Franklin.

Added Mitchell: "Our neighborhood is waking up to what you can do with a piece of land like this, with the right kind of cooperation. We have still other improvements in mind—softball, tennis, basketball, and possibly an indoor recreation building."

With a new season for the park and its pool underway, though, Mitchell predicted: "Our youngsters are learning fast. We'll soon have our own diving and racing teams." —WILLIAM A. PHILLIPS, area conservationist, SCS, Franklin, Va. ♦

Gravel deposit paves way for community playground

New York

In 1965, representatives of the Lions Club of Pawling, N.Y., met a Soil Conservation Service employee at the Washington township swimming pool.

The committee had observed that several communities in the Dutchess County Soil and Water Conservation District had developed recreation areas around ponds. They had questions.

Aren't such ponds muddy when 200 or 300 kids are splashing around? What does one cost to build? Do the towns charge admission, and how much?

For years citizens of Pawling had realized the need for a recreational park. When a 75-acre farm close to the village became available for purchase the Lions Club decided to investigate.

The key to the project was whether a suitable pond could be built on the property. The Lions Club committee asked Harold Wright, chairman of the Dutchess District, if the SCS would check soil suitability and other factors.

The SCS men indicated that a pond site of about 2½ acres was

feasible, and it would be well supplied with clean, even potable, ground water. The club decided to buy the property and an additional adjoining 9 acres.

Until the day the sale of gravel became a possibility, the Lions were wondering where the money was coming from to develop the site. They stood there kicking the gravel when the SCS engineer asked, "Where's all that gravel going I see being hauled through Pawling?"

The gravel had been going to a road job in Westchester County. A Dutchess County contractor was one of the haulers. The firm, on the strength of the findings in test pits, agreed to take the gravel and to finish off the pond if there could be one.

The pit created by removing the gravel became a beautiful pond, supplied with clear, cool water. Today the little farm on the outskirts of Pawling also has two ball diamonds, picnic areas, an outdoor theater site, and an \$80,000 bathhouse, complete with shower rooms, lounge, canteen, and kitchen—all overlooking the pond. It is known

as the Edward R. Murrow Memorial Park.

Until Labor Day the place is hopping with all the summer activities that such a park affords. In addition there is trout fishing, and in winter ice skating, snowmobiling, and skiing.—JOHN J. PORTER, district conservationist, SCS, Millbrook, N.Y.

Michigan

Detroit's water pipelines guided to safe ground

The cost of preparing to meet Detroit's future water needs would be much higher if it were not for SCS soil scientists working with the Detroit Metropolitan Water Service.

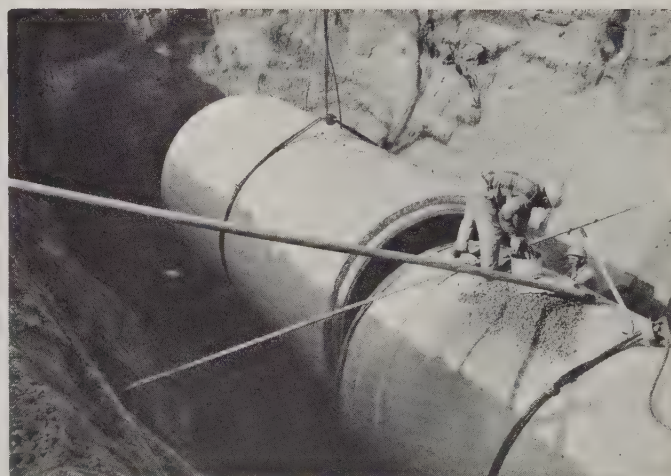
Since 1963, they have helped Water Service planners chart a safe course through soil hazards in a 4,000-square-mile service area. Scientists prepare strip soil maps of proposed pipeline routes and note questionable areas that are eventually examined in detail by consulting engineers. Under an agreement with SCS, the soil scientists' salaries and other expenses are contracted for by the DMWS.

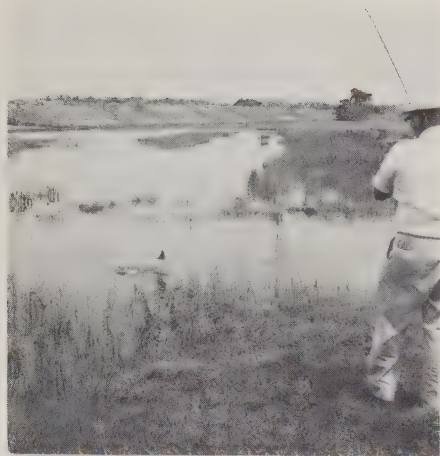
Before SCS assistance began, an encounter with a typical critical soil area near Pontiac, Mich., added \$100,000 to the original construction cost estimate. High right-of-way costs for the 8- to 10-foot pipes linking Lake Huron with metropolitan Detroit and Flint preclude any more expensive detours.

Children enjoy the swimming pool.



Installing an 8-foot water main.





Fly fishing in diked water area.

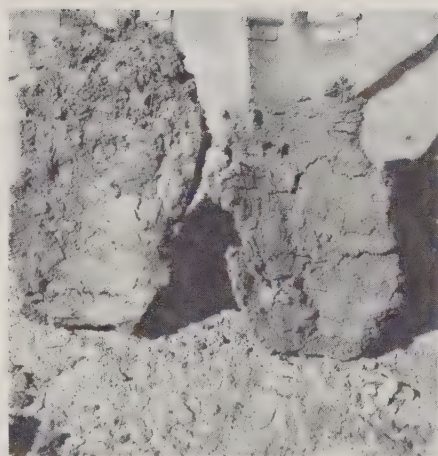
With many miles of pipeline yet to be laid, DMWS Engineer Ron Bekkala says: "Not knowing about soil problem areas could cost us a fortune. I don't think we'd dare move without SCS guidance."—JERRY D. LARSON, *soil scientist, SCS, Ann Arbor, Mich.*

Florida

Improving fish habitats in drainage systems

During the past 25 years more than 500 miles of drainage mains and laterals, dikes, and diversions have been constructed in Florida's Osceola Soil and Water Conservation District. During the first 6 or 8 years, little or no attention was paid to the waters created by these works. Any recreational or fish and wildlife benefits resulting were a happy by-product of the practice installed and were regarded as coincidental. Drainage systems are now designed to ensure recreational benefits. Sometimes the additional cost is substantially above that necessary for drainage alone.

In 1953, Leroy Bass, then a member of the Osceola District board of supervisors, requested assistance through the district to design and lay out a water-control system on his 17,000-acre ranch at Kenansville. The watershed draining through his ranch was about 30,000 acres. The outlet was through sloughs and cypress swamps, with an ill-defined channel discharging into Blue Cypress Creek, the head-



Terrace saves 9 inches of topsoil.

waters of the St. Johns River. Periodic droughts cause shallow canals to dry up.

It was decided to deepen certain areas 2 to 3 feet below the normal bottom of the canal, to see if a year-round fish population could be maintained. The results exceeded expectations: The Bass Canal has consistently produced some of the finest black bass fishing in the county. One reason for this is believed to be related to water exchange in the canal.

It was designed to remove water under range conditions and, as a consequence, overflows its banks periodically. This flooding flushes out water weeds and organic accumulations, provides additional spawning areas for fish, and increases fish food sources.

Since the first effort, fish habitat improvements have been built into many water-control systems in the district, and all have proved productive. The Osceola District office receives continuing reports of good catches of bass and bream as big as 10½ pounds.—WALTER B. HUTCHESON, *district conservationist, SCS, Kissimmee, Fla.*

Nebraska

What good is terracing? This field has an answer

The interesting thing about a certain field on the J. E. Conklin farm near Hubbell, Nebr., is the 9-inch depth of its topsoil.

Other fields in the area with the

same slope and same soil type have lost so much soil that what remains can no longer be identified truly as topsoil.

The Conklin field was terraced in 1933 in a demonstration that attracted 400 landowners.

Francis Wiedel of the Soil Conservation Service and a conservation contractor noticed the difference in topsoil depth when the contractor moved into the field to begin a re-terracing job.

The old terrace system had 12-foot channels and 8-foot side slopes. A steel-wheeled tractor and a pull grader were used.

Wiedel observed that the soil, with its better tilth and moisture-holding capacity, worked more easily. Fertility was intact, proof enough of the value of terracing as a conservation measure to protect the soil resource, he reported.—DWIGHT I. PUMPHREY, *district conservationist, SCS, Hebron, Nebr.*

Tennessee

Football fields in shape for summer scrimmages

Suitable climate for summer football practice came naturally to East Tennessee State University in the mountainous country around Johnson City. But fields had to be improved before they could withstand the footwork of the Atlanta Falcons and the school teams.

Arrangements for SCS technical advice on drainage and vegetation problems were made by the Washington County Soil Conservation District at the request of head football coach, John R. Bell, and members of the Alumni Association's Buck-O-Mo Boosters Club.

"We had enough room for the four practice fields we needed for the Falcons and ourselves," Bell said, "but the area was subject to flooding. After each rain, pools in low places made the soil soggy, damaged existing grass, and eventually became mudholes."

In 1967 two fields were raised above the flood plain, and a waterway was shaped to carry away runoff. After provision was made for



After big rain, Best and Myers look at structure well protected by dense fescue grass.

internal drainage, the entire area was seeded to fescue and bluegrass.

That July, the Falcons put the fields to the test. Twice daily for 2 months, cleated shoes and 6 tons of muscle dug into the sod. The playing surface held up again during another 60 days of hard use the following summer. Coach Bell added new topsoil and reseeded the fields in the spring of 1969 according to a normal maintenance plan.

"Vegetation has held up well, considering the rough treatment it has been through," Bell said.—A. S. HARVEY, *district conservationist, SCS, Jonesboro, Tenn.*

Ohio

Conservation effort paid the night of 'big rain'

Vincent Best of Norwalk township in Huron County, Ohio, was echoing what hundreds of landowners were saying after what they called "the big rain." Twelve inches fell overnight in July 1969.

"Conservation work is like taking out insurance: You need it when you don't expect it," he said.

A flood-restricting concrete spillway in one of his fields had saved his soil and his crop, Best explained. He had been having trouble with an active gully for years.

"When we designed that structure, we didn't have that kind of rain in mind," said Martin Myers, Soil Conservation Service conser-

vationist at Norwalk. "But it did the job."

The structure received the runoff from 100 acres. The fescue grass on the emergency spillway carried the high volume of water without damage.

For 20 years cooperators in the Huron Soil and Water Conservation District had been working on conservation farm plans. Their work paid dividends that night.—GENE F. BALTES, *district conservationist, SCS, Tiffin, Ohio.*

Texas

Exotic game makes way for conservation work

The Bear Creek Scout Camp, in the beautiful Hill Country of Texas, is responding to a long-range conservation plan designed to protect and improve its natural resources.

As a result, future Scouts will be able to enjoy the natural rugged beauty of the area.

The Alamo Area Council, a 15-county group around San Antonio, received 775 acres of land as a gift from Captain and Mrs. Eddie Rick-enbacker in 1959, and bought another 1,892 acres. Included in the gift were 500 head of Indian and African antelope and Japanese deer.

The grass resource had suffered from heavy stocking of these game animals during the drought of the 1950's. The animals were trapped and sold to other ranchers as the first step in restoring the vegetation. They now contribute to a growing popularity of "exotic" game hunting throughout Texas.

The conservation plan developed by the Bear Creek Camp committee with the help of Soil Conservation Service conservationists included pruning and thinning of brush for beautification and better wildlife habitat. As part of the initiation of the Order of the Arrow last summer, 1,000 candidates helped with the brush pruning and thinning. The native grasses and other vegetation now are rapidly recovering.

Fifteen hundred Scouts enjoyed the camp last summer. Facilities

will be needed to accommodate 5,000 for a summer in the not-too-distant future, leaders say.—RAY-FORD J. BRISTER, *district conservationist, SCS, Kerrville, Tex.*

Arizona

Maps, soil data used in building golf course

Golfing residents of Willcox, Ariz., like most folks attached to the sport, were willing to accept reasonable challenge from fairways, hazards, and greens.

The Willcox course in Sulphur Springs Valley, however, was too much—intolerable, they agreed. Who could enjoy the pavement-like fairways with the alkali spots glaring in the sun and covered with puncture vine and weeds?

They decided only a new course would do. Ray Hardy, the pro at the Yucca Sierra Country Club, got the assignment.

Among the rural and urban golfers were landowners with experience in the use of Soil Conservation Service technical help available through local soil conservation districts. Soon Hardy found himself gathering information on the proposed site from information in the soil survey of the area. And on aerial maps, such as are used in the development of farm and ranch conservation plans, he located fairways, greens, traps, and clubhouse.

He put the water hazards in the drainways, he explained, to utilize the water from rain and from irrigation runoff and to reduce soil erosion. Soil tests were made to correct problems.

The result, although Hardy insists he is not through with the job, is a beautiful layout with plenty of challenge for those who play the game. And much more satisfaction in playing a course as it is supposed to be.—GARY JACKSON, *soil conservationist, SCS, Yuma, Ariz.* ♦

Rice for cover wins friends

By Robert M. Craig

Conservation agronomist, SCS, Gainesville, Fla.

Rice, one of the world's oldest cultivated crops, is being used in a new way by Florida's vegetable producers in the Palm Beach area. Farmers are growing rice for soil cover. There are side benefits—food for dove and quail and replacement of important organic matter to the soil.

After the Palm Beach-Broward Soil and Water Conservation District was organized in 1964, the use of cover crops became an important part of its program of conservation. Results have been good. Today, an estimated 4,000 acres are planted to summer cover crops for soil improvement and prevention of erosion. Millet, sorghum, hairy indigo, and jointvetch are used, too. But rice is the most important.

Palm Beach-Broward District supervisor, Fritz Stein, of Belle Glade, near Lake Okeechobee, had been growing rice on organic soils as a



This field, previously used for winter vegetables, has recently been planted to a rice cover crop. The field will be flooded to a depth of about 5 inches for nematode control.

grain crop under the Agricultural Conservation Program. He was one of the first people of the area to realize its potential for cover.

Probably the most important fact is that rice can be used for cover during the off-season, when vegetable land is flooded for nematode control. E. E. Cooper, another of the Palm Beach-Broward District supervisors, who lives in Boynton Beach, and several others started using rice as a cover crop on mineral soils that occur close to the coast. Rice performed just as well on these mineral soils and is now widely used.

Cooper uses rice as a summer cover crop on about 100 acres he plants to peppers, squash, and beans during the winter vegetable season. He says that rice is the best cover crop to use before and after winter vegetables. According to Cooper, dove and quail taken in the vicinity of his ricefields during the last hunting season were unusually fat, and their crops were full of rice grains.

Smaller birds will ride the seed-heads to the ground and eat their fill of rice.

Clyde Parnell, manager of Perfection Farms at Boynton Beach, is enthusiastic about rice. Parnell reports a rice cover crop before a crop of peppers has resulted in a 69-bushel-an-acre increase over the state average.

Another convert to rice for cover is R. E. Lee of Lake Worth. He says that most of the doves taken this year around his place had feasted on rice. According to Lee, they preferred rice to browntop millet, a proved dove food.

There are several reasons why rice is a good cover crop on winter vegetable lands. It has the advantage of growing under flood conditions. These are the conditions for nematode control. It also produces large amounts of organic materials for soil improvement. The thick cover reduces wind erosion on mineral soils. Rice has the added advantage of being usable on both organic or mineral soils, and it fits well into the winter vegetable management rotation.

Growers find they are producing better quality vegetables following a rice cover crop. ♦



E. E. Cooper, farmer, and D. E. Vandergrift, SCS, examine the rice cover crop planted on winter-vegetable land.

Meetings . . .

Izaak Walton focuses on 'human numbers'

The Izaak Walton League of America will present "Man and His Environment—the Question of Human Numbers" as its theme at its 48th national convention in Norfolk, Va., July 8-10.

The main program, built around the question of population problems, will be handled by a panel of experts in the fields of demography, ecology, and environmental news. Dr. Durward L. Allen, well-known professor of wildlife and ecology at Purdue University, will deliver the keynote address.

Other issues to be highlighted include: Review of water and air pollution control programs; need to accelerate public land acquisition for national and local parklands and other recreation areas by both public and private interests; plans to work with young Americans (high school and college age) on environmental programs; and assessment of the League's effectiveness in helping to solve environmental problems.

Environmental quality BPW's concern

"Era of Responsibility" will be the theme at the convention and workshops of the National Federation of Business and Professional Women's Clubs, Inc., in Honolulu, Hawaii, July 19-23.

Among topics to be discussed are, "Environmental Quality," "Drugs," "Cultural Progress," and "Crime Prevention."

Great Plains Council to discuss broadened program

The Great Plains Agricultural Council will meet July 30-31 in Albuquerque, N. Mex., to consider new regulations and operating procedures and to revise existing ones where necessary for the broadened Great Plains Conservation Program.

The new Great Plains Program handbook will be ready for review.

SCS state conservationists in the Great Plains states plan to meet in Albuquerque before the meeting to discuss policy and budgets for the program.

Nurserymen keep up with industry needs

The 95th annual meeting of the American Association of Nurserymen will be held July 18-22 in San Francisco, Calif. Although the association is nearly 100 years old, its more than 1,800 members continue to modify its scope of activities to meet current industry needs.

The association's membership has grown 32 percent within the past 4 years.

Dates and places

July 1-6, National Education Association, San Francisco, Calif.

8-10, American Society of Agricultural Engineers, Minneapolis, Minn.

8-10, Izaak Walton League of America, Norfolk, Va.

18-22, American Association of Nurserymen, Inc., San Francisco, Calif.

19-23, National Association of Business and Professional Women, Inc., Honolulu, Hawaii.

26-29, National Association of Counties, Atlanta, Ga.

30-31, Great Plains Agricultural Council, Albuquerque, New Mex.

August

2-4, Community Development Society, University of Georgia, Athens, Ga.

16-20, Conservation Education Association, Lafayette, La.

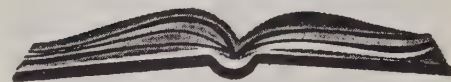
23-26, Association of American Geographers, San Francisco, Calif.

23-28, American Society of Agronomy and Soil Science Society of America, Tucson, Ariz. ♦

Cleaning recharge water

Coagulation by chemicals may help clean up some of the water used to artificially recharge the Ogallala aquifer in Texas. Scientists with the Agricultural Research Service at Bushland, Tex., are studying ways to remove salts, pesticides, and silt carried into playa lakes by land runoff. Chemically coagulated pollutants "fall out" before water is pumped back into underground sources. ♦

Review



Community Action Guidebook for Soil Erosion and Sediment Control. BY MEL D. POWELL, WILLIAM C. WINTER, AND WILLIAM P. BODWITCH. 1970. *National Association of Counties Research Foundation*. Washington, D.C. 64 pp., illus.

This guidebook is a comprehensive new aid to local efforts in coping with the Nation's most abundant water pollutant, sediment. It was prepared under a \$41,000 grant from the Federal Water Quality Administration. SCS provided much of the basic information from which the guidebook was developed.

The publication contains useful sediment-damage statistics and technical control methods, but it deals primarily with administrative tactics. It weaves case histories of existing sediment-control programs into a 10-chapter description of ways to organize, finance, implement, and enforce the programs.

Major emphasis is on sedimentation in developing areas, where construction alters drainage patterns, increases runoff, and removes vegetation for long periods.

A draft of the guidebook was reviewed at the National Conference on Sediment Control held last September in Washington, D.C. USDA was a co-sponsor of the conference. The publication first appeared as an insert in the May 1970 issue of NACO's monthly magazine.

County officials and conservation district leaders should find the guidebook a highly useful tool in working together to help communities grow without damaging the environment.—LEE B. SHIELDS, *Information Division, SCS, Washington, D.C.*

Soils of the Tugela Basin. BY E. R. ORCHARD, *et. al.* 1969. *Natal Town and Regional Planning Report, Vol. 15. Natal, South Africa.* 263 pp., illus. (About \$12 U.S.; \$0.70 a sheet for maps). 14 soil maps at 1:100,000 scale.

American soil scientists will find this work interesting. Soil descriptions, with some laboratory data and many colored plates, are presented in a well-printed book. The soil maps were made largely through study of air photos with some ground study of soil profiles. The need in town-and-country planning for standard engineering test data is recognized. Both the system of classification and the nomenclature appear to be unique; yet both familiar and unfamiliar terms are explained in a glossary. The work should be useful for general planning. The authors realize that because of the small scale and heavy reliance on photo interpretation more detailed soil maps from closer on-the-ground study would be required for use in operational planning.—CHARLES E. KELLOGG, *deputy administrator for Soil Survey, SCS, Washington, D.C.*

New publications

Our 31,000 Largest Farms. BY RADOJE NIKOLITCH. 1970. *USDA Economic Research Service Agr. Econ. Rpt. 175.* 64 pp., illus. Presents comprehensive national and regional information on America's largest farms, based on a special tabulation in the 1964 Census of Agriculture. In 1964, 31,401 farms with product sales of \$100,000 or more accounted for 24 percent of all farm product sales. Of these farms, 919 had sales of \$1 million or more, or 7 percent of all sales. In 1959, only 19,979 farms had sales of \$100,000 or more, and 408 farms had sales of \$1 million or more—accounting for 16 percent and 4 percent of all farm sales. In 1964, while farms with product sales of \$100,000 or more accounted for 12 percent of all farm product sales in the North and 24 percent in the South, they accounted for 53 percent in the West. Some 524 farms with product sales of \$1 million or more, or 0.2 percent of all farms in the West, accounted for more than a fifth of all farm product sales in that part of the country.

An Economic Analysis of Level Bench Systems for Forage Production in North Dakota. BY WALLACE McMARTIN, HOWARD J. HAAS, AND WAYNE O. WILLIS. 1970. *USDA Economic Research Service and Agricultural Research Service Conservation Res. Rpt. 14.* 21 pp., illus. Three sets of trials analyzed at Mandan: (1) Cropland study, comparing

production from a wheat and corn rotation on benches with and without contributing areas and on natural slopes; (2) grassland study, comparing alfalfa and brome grass hay production from 50-foot-wide benches with and without contributing areas and from natural slopes; and (3) contributing area study, investigating the effectiveness contributing areas of various sizes in supplying runoff water to level benches.

Cropland Trends Since World War II, Regional Changes in Acreage and Use. BY ORVILLE E. KRAUSE. 1970. *USDA Economic Research Service Econ. Rpt. 177.* 15 pp., illus. Discusses a drop of 27 million acres between 1944-64 in land classed as cropland (from 403 million acres to 376 million). Points out that land was being developed in some parts of the country and abandoned or converted from cropland in other places. During these 20 years, 868 counties showed a total increase of 26.7 million acres of cropland while 2,204 counties showed a total decrease of 53.5 million—a net decrease of 26.8 million.

Rural Industrialization in the Southeast Coastal Plain: Case Study of a New Brick Factory in Summerville, S.C. BY JACKSON B. MCELVEEN. 1970. *USDA Economic Research Service Agr. Econ. Rpt. 174.* 13 pp., illus. Describes the local economy of a rural area of South Carolina at the time a brick plant was established and examines the short-run impact of the plant through its first year of operation in 1963. Indicates potential for constructing various types of factories in the three rural counties to serve Charleston and to provide needed jobs for rural residents.

Conservation, Science Fair Projects. BY PAUL E. LEMMON, THEODORE C. GREEN, AND MERLE S. LOWDEN. 1970. *Soil Conservation Society of America.* 31 pp. Ankeny, Iowa. \$1.00. Supersedes *Conservation of Our Renewable Natural Resources—Suggestions for Science Fair Projects in Junior and Senior High Schools* (Agr. Stabil. and Conserv. Serv., 1964). Suggests ways to select the general scientific field and specific area of work, outlines some conservation projects, and lists publications for reference and guidance.

Rural Poverty in Three Southern Regions: Mississippi Delta, Ozarks, Southeast Coastal Plain. BY JOHN L. MCCOY. 1970. *USDA Economic Research Service Agr. Econ. Rpt. 176.* 38 pp., illus. Compares major findings of the first series of area studies on the Mississippi Delta, the Ozarks, and the Southeast Coastal Plain but focuses almost exclusively on poverty and its relationships to certain individual characteristics as distributed across the three regions of investigation.

Pictorial Keys to Arthropods, Reptiles, Birds and Mammals of Public Health Significance. 1969. *U.S. Dept. of Health, Education and Welfare, Public Health Service Publ. 1955.* 192 pp., illus.; spiral binding. \$2.25. Easy identification aid to a wide range of animal species of major importance to man.

Soil surveys

Sedgwick County, Colorado. BY JOHN I. BRUBACHER AND TOM R. MOORE. 1970. 61 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by John I. Brubacher, Tom R. Moore, Clayton F. Spears and Everett E. Geib.

Ventura Area, California. BY RONALD D. EDWARDS, DANIEL F. RABEY, AND RICHARD W. KOVER. 1970. 104 pp., illus.; maps 2 3/8 inches to the mile (1:24,000).

Antelope Valley Area, California. BY GEORGE A. WOODRUFF, WILLIAM J. MCCOY, AND WAYNE B. SHELDON. 1970. 187 pp., illus.; maps 2 3/8 inches to the mile (1:24,000).

USDA involved in environment

The Department of Agriculture is broadly involved in the problems of the environment. Of all the land in farms and ranches in the United States, 68 percent is directly involved in USDA soil and water conservation programs. USDA administers 187 million acres of national forests and grasslands. It has key responsibility relative to the use of agricultural chemicals—particularly pesticides—by both farm and non-farm people. ♦

First national survey of roadside litter

The first national survey of roadside litter conducted by the Highway Research Board of the National Academy of Sciences shows that American motorists every year drop nearly 16,000 pieces of litter per mile.

This project was conducted in cooperation with the highway departments of 29 participating states and sponsored by Keep America Beautiful, Inc., the national litter-prevention organization.

The findings also reveal that total litter volume positively correlates with average daily traffic. The more cars the more litter. ♦

Recon . . .

A quick overview of the conservation scene

To encourage development of more sediment-control ordinances in south-central Michigan, the Grand River Watershed Council recently published *Soil Erosion and Sedimentation Control Programs*. The 16-page, illustrated brochure is part of the council's campaign to generate public awareness and support for "erosion control on a regional basis." Local soil conservation districts, SCS, and the Cooperative Extension Service are joining the council in the basinwide effort.

More trees . . .

The re-creation of a forest like the one California's Mariposa County had 150 years ago is the aim of an intensified tree-planting program begun by the Mariposa Soil Conservation District. To get things growing, the California district donates a few trees to any landowner and helps put them in the ground.

. . . means less noise

Properly located barriers of trees and shrubs can reduce noise by as much as 50 percent, according to a continuing study at the University of Nebraska. Noise reduction by trees in combination with grass can be as much as 65 percent. Tree height is important since sound is diffused and absorbed over a larger area.

"Farmers have been fighting pollution for years. The only difference is they have been calling it erosion control. We can't afford at present-day prices of fertilizer and pesticides

to let them be washed into streams and rivers."—SAM STUDEBAKER, former president of the National Association of Conservation Districts, recent recipient of Ohio's Conservation Award.

A technical guide for erosion control tailored to New Jersey's soils and climate is being published as a supplement to a similar publication released this spring by the SCS Regional Technical Service Center at Upper Darby, Pa. New Jersey's *Guide for Sediment, Pollution and Erosion Control in Urban Areas* will be distributed initially to SCS field offices throughout the state.

Sediment-control scoreboard

—The City Council of Solon, Ohio, passed a resolution instructing the city solicitor to prepare a sediment- and erosion-control ordinance. The Cuyahoga Soil Conservation District and SCS will assist in the review of all plans for future land use development in the city. This is the third such ordinance to be passed this year in Ohio.

—By the end of March 1970, 13 Pennsylvania soil and water conservation districts had entered into memorandums of understanding with country planning commissions to review subdivision plans for sediment and erosion-control measures.

—Amherst, N.Y., a suburb of Buffalo, now includes soil and water conservation-planning requirements in procedures leading to approval of permits to build subdivisions.

Urban process

. . . The whole urbanization process has become an increasingly troublesome environmental problem, and not from the standpoint of sedimentation alone. A study released some months ago by the American Institute of Planners revealed that land is being urbanized at the rate of 3,000 acres per day.

We are not so much concerned with running out of land as with run-

ning short of land for particular uses. Even with a continued rise in total population one-half of the counties in the United States are losing population. A reversal of this trend is not only desirable, it is essential.

There are many sound reasons for an orderly development of less densely populated areas. We have the space and we have the ability. Science, technology, and the ingenuity of the American farmers with the help of public agencies, private institutions, and industries serving agriculture have gone a long way toward making this possible.—UNDER SECRETARY OF AGRICULTURE, J. PHIL CAMPBELL, at an Earth Day observance April 22, 1970, Washington, D.C.

In *A New Life for the Country*, a 44-page report, the President's Task Force on Rural Development recommends: The creation of a rural development credit bank; greater use of funds for comprehensive planning; increased involvement of Land-Grant colleges and universities in education and information programs for countryside communities; development of zoning guidelines that provide for adequate open space and recreation in growth centers; a national campaign to involve people in their local government; and other programs "intended to help create a Nation of greater beauty, deeper satisfaction, and expanded opportunities for all Americans. . ."

Maryland Governor Marvin Mandel signed the Nation's first statewide sediment-control program on "Earth Day" (Apr. 22, 1970). House Bill 1151, which had been passed by the Maryland General Assembly earlier this spring, will become effective July 1, 1970. It is an expansion of the Patuxent River Watershed Protection Law that has been in effect since July 1, 1969. All land clearing and earthmoving for construction of any kind must hinge on a sediment-control plan and program approved by the soil conservation district.



Planning for the environment

"Environmental problems have become critical, and cooperation between all levels of government will be required in a massive effort to restore and maintain environmental quality."

The statement, echoing one of our pressing national worries, is a part of the foreword of a new publication on the conservation scene, **Community Action Guidebook for Soil Erosion and Sediment Control**.

The publisher is the National Association of Counties Research Foundation, with support from the National Association of Conservation Districts and the Soil Conservation Society of America. The book's appearance reflects the start of a long and forceful step toward an urgent goal.

In hundreds of counties of the United States—and in cities, towns, and villages—a movement of singular importance is gaining momentum. Local officials and heads of civic groups are launching determined efforts, not for rapid business and industrial expansion as in former years, but for a wholesome, orderly development of the whole area in which residents may live a good life, and in which new business and industry may find a compatible climate.

These local units of government are the bodies with the muscle and the tools, the authorities and the action corridors, to create the environment our Nation is seeking. State and Federal governments can help with the job, but the local leaders—with the ability to communicate with the community—carry the load.

The element too often lacking to produce wise land use decisions along this broad front has been information on the character and limitations of land, water, and related resources for mankind's use. As the guidebook points out, much of this information, along with technical help for its use, is available from the Soil Conservation Service.

SCS, in turn, has the responsibility to be there at the time of planning and decision-making and when the plans take form on the land. Land use and health ordinances and building codes relating to

land and water resources are specific areas in which SCS technical help can backstop the efforts of local governments.

Our goals for the 1970's include participation in land, water, and related phases of comprehensive area planning as a basis for the swift growth ahead for this Nation. Planning starts with land and water, and it succeeds as the people concerned work together in a spirit of cooperation and rational compromise.

A new relationship is developing among conservation district leaders, SCS, and the leaders of county and city governments. It is a relationship that can be counted on to yield sound planning decisions and to avoid some of those "irreversible mistakes" which have raised ugly heads to haunt many communities in recent decades.

The new guidebook of the National Association of Counties, though aimed at sediment control as its specific target, is a milepost on the long journey toward the conservation use of all our land and water resources, on both sides of city and county lines.

Kenneth E. Grant



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Planting guide aids road-erosion control

In northwestern Colorado, the state's Department of Highways is using a Soil Conservation Service-prepared guide to control erosion and stabilize soils along State and Interstate highways.

The publication, *Planting Guide for Difficult Sites*, is prepared by SCS technicians on a county-by-county basis. It delineates climatic zones and ties planting recommendations to each zone.

The climatic zones are a combination of ranges in precipitation and temperature which correspond closely to elevation. These two factors with soil influences result in different natural plant communities. Each county Planting Guide consists of a county map with climatic zone designations, plus the seeding recommendations for each climatic zone, with slope and soil differences considered. Alkalinity and sandiness are also included where they occur.

Several factors influenced the need for guidelines to stabilize soils in northwestern Colorado. The geographical area has a complex climate with widely varying precipitation patterns, elevations, and soils. Interstate Highway 70 construction is well underway in the area. With these problems in mind, and using the guide as a basis, decisions can be made as to where and when to establish adapted planting materials

for erosion prevention and beautification of the right-of-way.—JAMES E. PRESTON AND LEO W. MILLS, *area range conservationist, SCS, Glenwood Springs, Colo., and landscape foreman, Colorado Highway Department, Grand Junction, Colo.* ♦

Highway crews (below) plant and stake shrubs on Interstate 70 near Glenwood, Colo. A few miles west, an unprotected roadbank (right) is heavily damaged.

